EPA/ROD/R02-85/020
1985

EPA Superfund
Record of Decision:

HELEN KRAMER LANDFILL
EPA ID: NJD980505366
OU 01
MANTUA TOWNSHIP, NJ
09/27/1985

HELEN KRAMER LANDFILL, MANTUA TOWNSHIP, NEW JERSEY.

#DR
DOCUMENTS REVIEWED

I AM BASING MY DECISION ON THE FOLLOWING DOCUMENTS DESCRIBING THE ANALYSIS OF COST-EFFECTIVENESS OF REMEDIAL ALTERNATIVES FOR THE HELEN KRAMER LANDFILL SITE:

- REMEDIAL INVESTIGATION REPORT AND FEASIBILITY STUDY OF ALTERNATIVES, HELEN KRAMER LANDFILL, R.E. WRIGHT ASSOCIATES, JULY 1985

- STAFF SUMMARIES AND RECOMMENDATIONS FOR REMEDIAL ALTERNATIVE SELECTION

- RESPONSIVENESS SUMMARY FOR THE HELEN KRAMER SITE.

#DE
DECLARATIONS

CONSISTENT WITH THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA), AND THE NATIONAL OIL AND HAZARDOUS SUBSTANCES CONTINGENCY PLAN (NCP), 40 CFR PART 300, AND PURSUANT TO EPA DELEGATION MANUAL ORDER 14-5, I HAVE DETERMINED THAT THE REMEDY DESCRIBED ABOVE IS THE COST-EFFECTIVE REMEDIAL ACTION ALTERNATIVE FOR THE HELEN KRAMER LANDFILL SITE.

IT IS HEREBY DETERMINED THAT IMPLEMENTATION OF THIS REMEDIAL ACTION IS THE LOWEST COST ALTERNATIVE THAT IS TECHNOLOGICALLY FEASIBLE AND RELIABLE, AND WHICH EFFECTIVELY MITIGATES AND MINIMIZES DAMAGES TO AND PROVIDES ADEQUATE PROTECTION OF PUBLIC HEALTH, WELFARE AND THE ENVIRONMENT. IT IS ALSO HEREBY DETERMINED THAT THE SELECTED REMEDY IS APPROPRIATE WHEN BALANCED AGAINST THE AVAILABILITY OF TRUST FUND MONIES FOR USE AT OTHER SITES.

THE STATE OF NEW JERSEY HAS BEEN CONSULTED AND AGREES WITH THE SELECTED REMEDY.

SEPTEMBER 27, 1985	CHRISTOPHER J. DAGGETT
DATE	REGIONAL ADMINISTRATOR.

HELEN KRAMER LANDFILL SITE
SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

#SLD
SITE LOCATION AND DESCRIPTION

THE HELEN KRAMER LANDFILL IS LOCATED IN MANTUA TOWNSHIP, GLOUCESTER COUNTY, NEW JERSEY, APPROXIMATELY FIVE MILES SOUTH OF WOODBURY, NEW JERSEY. THE APPROXIMATE LATITUDE AND LONGITUDE OF THE SITE ARE 39 DEGREES 36' 45" NORTH AND 75 DEGREES 12' 15" WEST, RESPECTIVELY (SEE FIGURE 1-1). THE SITE IS BOUNDED ON THE NORTH BY JESSUPS MILL ROAD, THE EAST BY EDWARDS RUN, THE SOUTH BY BOODY MILL ROAD, AND THE WEST BY LEAVE ROAD. THE SITE ENCOMPASSES A 66-ACRE REFUSE AREA AND AN 11-ACRE STRESSED AREA BETWEEN THE REFUSE AND EDWARDS RUN.

CENTRE CITY, THE NEAREST RESIDENTIAL COMMUNITY, IS 1,200 FEET EAST OF THE SITE. THE TOWN OF MANTUA IS 1.4 MILES NORTHEAST OF THE SITE.

THE LANDFILL IS DOMINATED BY A MAJOR NORTH-SOUTH RIDGE APPROXIMATELY 1,500 FEET IN LENGTH WITH GREATER THAN 100-FOOT RELIEF (SEE FIGURE 1-2). IN THE SOUTHERN PORTION OF THE SITE, THE RIDGE TURNS TO THE SOUTHEAST AND MAINTAINS AN ELEVATION OF 80 TO 90 FEET ABOVE EDWARDS RUN FOR A DISTANCE OF ABOUT 600 FEET. THE RIDGE IS CHARACTERIZED BY RANDOMLY PLACED, UNCOMPACTED, AND UNCOVERED REFUSE, WITH NUMEROUS LONGITUDINAL SETTLEMENT CRACKS WHICH VENT METHANE AND STEAM.

THE WESTERN SIDE OF THE LANDFILL IS MODERATELY SLOPED WITH SURFACE GRADES AVERAGING LESS THAN 5 PERCENT AND RARELY EXCEEDING 10 PERCENT. LEAVE ROAD IS AN ACCESS ROAD WHICH PARALLELS THE WESTERN BOUNDARY OF THE REFUSE ZONE.

THE WESTERN BOUNDARY OF THE SITE IS FORMED BY A ROW OF TREES AND BRUSH AND AN OPEN TRENCH, APPROXIMATELY 2 FEET DEEP, CONSTRUCTED TO "CUT-OFF" GAS MIGRATION.

THE NORTHERN BOUNDARY OF THE LANDFILL IS THE KRAMER HOMESTEAD AND THE NORTH RAVINE. THE NORTH RAVINE CONTAINS TWO CONVERGING RIVULETS WHICH EMERGE FROM THE FILL AT ITS TOE AND COMBINE ON THE FLOODPLAIN OF EDWARDS RUN. DEAD VEGETATION, IRON STAINING, A DARK BROWN FOAMY LEACHATE, AND FOUL ODOR ARE PRESENT IN THIS AREA.

EDWARDS RUN IS LOCATED IMMEDIATELY EAST OF THE LANDFILL IN A RELATIVELY LOW-LYING AND WELL ENTRENCHED STREAM VALLEY. EDWARDS RUN ESSENTIALLY FORMS THE EASTERN BOUNDARY OF THE LANDFILL. STEEP ESCARPMENTS FORM BOTH SIDES OF THE STREAM VALLEY. EDWARDS RUN WAS PRIMARILY USED FOR RECREATION AND IRRIGATION. HIDDEN ACRES TOWNSHIP PARK LIES ALONG EDWARDS RUN ABOUT 4000 FEET DOWNSTREAM OF THE SITE. EDWARDS RUN FLOWS INTO MANTUA CREEK 2.8 MILES DOWNSTREAM OF THE SITE. MANTUA CREEK IS A TRIBUTARY TO THE DELAWARE RIVER.

SOUTH OF THE NORTH RAVINE, LEACHATE EMANATES FROM SEVERAL POINTS ALONG THE LANDFILL'S EASTERN SLOPE. THE SOIL IN THE AREA OF THESE LEACHATE DISCHARGES EXHIBITS A GREENISH TO DARK BROWN DISCOLORATION. THE VEGETATION IN THIS AREA IS STRESSED.

THE GRADIENT OF THE NORTHEAST FACING SLOPES OF THE LANDFILL IN THIS AREA IS ABOUT 20 TO 30 PERCENT AND HAS AN ELEVATION CHANGE OF 70 FEET.

A TWO TO THREE-ACRE POND CALLED THE "NORTH LAGOON" CONTAINS FROM ONE TO TWO MILLION GALLONS OF WATER AND IS LOCATED IN THE NORTHEAST CORNER OF THE SITE. LEACHATE FROM THE LANDFILL ACCUMULATES IN THIS POND AND IS ULTIMATELY DISCHARGED THROUGH THE POND'S NORTH END AND BOTTOM INTO EDWARDS RUN.

THE EASTERN SLOPE OF THE LANDFILL IS LONG AND STEEP. A 15 TO 20 PERCENT GRADE PRODUCES ELEVATION CHANGES ALONG THE SLOPE OF UP TO 100 FEET. NUMEROUS LEACHATE SEEPS APPEAR AT VARIOUS ELEVATIONS ALONG THE BASE OF THE SLOPE. FLOW IN THESE SEEPS MAY BE A FUNCTION OF ELEVATION SINCE LOWER SEEPS EXHIBIT GREATER FLOWS. A MAN-MADE DIKE ACROSS THE BASE OF THE LANDFILL EXTENDS ALONG EDWARDS RUN FROM THE NORTH LAGOON TO ABOUT MIDSITE. THIS DIKE IS CONSTRUCTED OF SANDY SOIL AND HAS NUMEROUS BREACHES, THROUGH WHICH LEACHATE DISCHARGES TO EDWARDS RUN.

TWO LEACHATE COLLECTION PONDS ARE LOCATED MIDWAY ALONG THE BASE OF THE EASTERN SLOPE. THESE PONDS WERE CONSTRUCTED IN ORDER TO CAPTURE AND RECIRCULATE LEACHATE BACK ONTO THE LANDFILL. ONE POND IS APPROXIMATELY TWO TO THREE FEET DEEP AND IS ABOUT 4,000 SQUARE FEET IN AREA. IT IS LINED WITH A HYPALON MEMBRANE WHICH IS TORN IN NUMEROUS PLACES. THERE IS NO APPARENT INLET TO THIS POND FROM THE SITE. SOUTH OF THE LINED POND ARE NUMEROUS SEEPS WHICH DRAIN INTO AN ADJACENT UNLINED POND OF APPROXIMATELY 1,200 SQUARE FEET IN AREA. THIS SMALLER POND IS FORMED BEHIND THE DIKE, BUT DISCHARGES TO EDWARDS RUN THROUGH A BREACH.

NUMEROUS LEACHATE SEEPS EXIST SOUTH OF THE LEACHATE COLLECTION PONDS ALONG THE EDGE OF THE FILL FOR A DISTANCE OF AT LEAST 500 FEET. THESE SEEPS GENERALLY APPEAR AT ELEVATION 30 FEET MEAN SEA LEVEL (MSL) AND DRAIN INTO SHALLOW GULLIES WHICH FLOW ACROSS THE SANDY BASE OF THE EASTERN SLOPE. THESE LEACHATE FLOWS GENERALLY DISCHARGE DIRECTLY INTO A WETLAND TO THE EAST, ALTHOUGH SOME OF THE FLOW RE-PERCOLATES INTO THE GROUND BEFORE ENTERING THE WETLAND.

THE WETLAND (ABOUT THREE ACRES) IS LOCATED EAST-SOUTHEAST OF THE CENTER OF THE LANDFILL. IT RECEIVES A LARGE PROPORTION OF THE LEACHATE WHICH MIGRATES FROM THE LANDFILL. VEGETATION IS EXTREMELY STRESSED AND THE SOIL IS STAINED BY LEACHATE. THE WETLAND DISCHARGES PRIMARILY FROM ITS NORTH END INTO EDWARDS RUN APPROXIMATELY 200 FEET SOUTH OF THE LEACHATE COLLECTION PONDS.

FURTHER SOUTH ALONG THE EASTERN SIDE IS THE SOUTH RAVINE. THIS FEATURE IS A TOPOGRAPHIC DEPRESSION IN THE SURFACE CONTOUR WHICH INTERSECTS THE CENTER RIDGE AT ITS BENDING POINT TOWARD THE SOUTH LOBE. THE SOUTH RAVINE EXHIBITS STEEP NATURAL SIDES SLOPED AT GREATER THAN 50 PERCENT. PRIOR TO BEING LANDFILLED, THIS GULLY WAS A MAJOR RUNOFF SWALE. TODAY, FLOW PERSISTS IN THE RAVINE AT TYPICAL DISCHARGE RATES OF 30 TO 50 GALLONS PER MINUTE. NUMEROUS LEACHATE SEEPS ENTER THE RAVINE FROM BOTH SIDES. LEACHATE FROM THE SOUTH RAVINE ENTERS THE WETLAND WHERE IT IS COMBINED WITH FLOWS FROM OTHER SEEPS. A FEW EMPTY OR CRUSHED DRUMS ARE IN THE SOUTH RAVINE, AND BURIED DRUMS ARE VISIBLE IN THE WALL HEAD OF THE RAVINE. THE ACCESSIBLE DRUMS WERE INSPECTED AND ARE EMPTY. MUCH OF THE VEGETATION ON THESE SLOPES IS SEVERELY STRESSED.

THE SOUTH LOBE RISES FROM THE EDWARDS RUN VALLEY VERY STEEPLY WITH A NATURAL SLOPE OF GREATER THAN 50 PERCENT. THE WETLAND FORMS THE SOUTH LOBE'S NORTHEASTERN BOUNDARY AND EDWARDS RUN SKIRTS ITS SOUTHEAST MARGIN. LEACHATE SEEPS OCCUR AT THE BASE OF THE SLOPE AND DISCHARGE DIRECTLY INTO EDWARDS RUN.

OFF SITE TO THE SOUTHEAST OF THE SOUTH LOBE IS A LARGE WETLAND AREA. SOME EVIDENCE OF LEACHATE STAINING WAS OBSERVED IN THIS AREA ALONG ITS BORDER WITH THE SOUTH LOBE. HOWEVER, THE STAINING RAPIDLY DISAPPEARED WITH DISTANCE FROM THE LANDFILL.

THE SOUTHEASTERN BORDER OF THE SITE IS FORMED BY A WOODED AREA. TWO DIRT ROADS RUN THROUGH THESE WOODS, AND RECENT REFUSE DUMPING HAS OCCURRED AT THE ENDS OF THESE ACCESS ROADS. THREE HOUSE TRAILERS (TWO OCCUPIED) ARE LOCATED SOUTH OF THE LANDFILL OFF OF BOODY MILL ROAD. BOODY MILL ROAD IS AN INFREQUENTLY TRAVELED DIRT ROAD WHICH IS ESSENTIALLY THE SOUTHERN BORDER OF THE LANDFILL, AND IS LITTLE USED BY ANYONE OTHER THAN LOCAL RESIDENTS.

#SH
SITE HISTORY

WASTE DISPOSAL AND ENFORCEMENT

THE HELEN KRAMER LANDFILL SITE WAS ORIGINALLY OPERATED AS A SAND AND GRAVEL PIT. THE SITE BECAME AN OPERATING LANDFILL BETWEEN 1963 AND 1965, DURING WHICH TIME LANDFILLING OCCURRED SIMULTANEOUSLY WITH SAND EXCAVATION. IN 1963, LARGE VOLUMES OF WASTES WERE DEPOSITED JUST NORTH OF THE SOUTH RAVINE. PONDS OF STANDING LIQUID WERE THEN LOCATED AROUND THE NORTH RAVINE. BETWEEN 1963 AND 1965, THE FILL WAS EXTENDED INTO THE SOUTH RAVINE, AND THE NORTH RAVINE WAS FILLED AND GRADED. VERY LITTLE IS KNOWN ABOUT HELEN KRAMER LANDFILL ACTIVITIES BETWEEN 1965 AND 1970.

IN 1970, AS A RESULT OF THE ENACTMENT OF THE NEW JERSEY SOLID WASTE MANAGEMENT ACT, THE SITE OPERATOR (MR. MARVIN JONAS) WAS ISSUED A TEMPORARY 1-YEAR REGISTRATION BY THE NJDEP, AND WAS GIVEN UNTIL JULY 1, 1971 TO SUBMIT A SANITARY LANDFILL DESIGN REQUIRED FOR PERMANENT REGISTRATION. SEVERAL MONTHS PRIOR TO THE JULY 1, 1971 DEADLINE, MR. JONAS INFORMED THE NJDEP THAT OPERATION OF THE LANDFILL WAS THE RESPONSIBILITY OF HELEN

KRAMER, OWNER OF THE PROPERTY ON WHICH THE LANDFILL IS LOCATED. THE REQUIRED LANDFILL DESIGN WAS NOT SUBMITTED UNTIL JULY OF 1973, AND BOTH IT AND SUBSEQUENT REVISIONS SUBMITTED IN JANUARY AND MARCH OF 1974 WERE DETERMINED TO BE INCOMPLETE BY THE NJDEP.

IN OCTOBER 1973, NJDEP INSPECTIONS NOTED THAT TRENCHES WERE BEING EXCAVATED AND USED FOR THE DISPOSAL OF CHEMICAL WASTE. A 20 BY 6 FOOT AREA OF CHEMICAL WASTE WAS NOTED, AS WAS THE DISPOSAL OF SEPTIC WASTE INTO AN ACTIVE LANDFILL FACE.

IN JANUARY 1974, SEVERAL INSPECTIONS NOTED THE PRESENCE OF CHEMICALS IN A DIKED-OFF AREA AND APPROXIMATELY 12 DRUMS ADJACENT TO THESE AREAS. CHEMICAL WASTE DISPOSAL WAS EVIDENT IN AT LEAST SEVEN LAGOONS. APPROXIMATELY 140 DRUMS THAT MAY HAVE CONTAINED SCRAP PAINT MATERIALS AND OTHER CHEMICAL WASTES HAD BEEN REPORTEDLY DUMPED INTO OPEN TRENCHES.

IN APRIL 1974, NJDEP PERSONNEL OBSERVED LEACHATE DISCHARGING INTO EDWARDS RUN FROM THE LANDFILL. PURSUANT TO THIS SIGHTING, NJDEP ISSUED A DEPARTMENTAL ORDER, A NOTICE OF PROSECUTION, AND NOTICE OF INTENT TO DENY RENEWAL OF APPROVED REGISTRATION FOR IMPROPER LANDFILL OPERATION AND CONTAMINATION OF WATERS OF THE STATE. ALSO, IN 1974, BECAUSE OF NEW REGULATORY AUTHORITY, THE NJDEP WAS ABLE TO SPECIFICALLY RESTRICT THE DISPOSAL OF HAZARDOUS WASTE AT THE LANDFILL. THE NJDEP ISSUED A STIPULATION AGAINST THE LANDFILL WHICH LIMITED IT TO THE DISPOSAL OF MUNICIPAL REFUSE FROM HOUSEHOLDS AND COMMERCIAL/INSTITUTIONAL ESTABLISHMENTS, SEWAGE SLUDGE, SEPTIC TANK WASTES, LEAVES, TREE STUMPS, AND BRANCHES.

A REVISED ENGINEERING DESIGN WAS SUBMITTED IN NOVEMBER OF 1974 AND WAS AGAIN FOUND TO BE DEFICIENT BY NJDEP.

A SECOND NOTICE OF PROSECUTION WAS ISSUED IN SEPTEMBER 1976 NOTIFYING HELEN KRAMER THAT HER REGISTRATION FOR LANDFILL OPERATION WOULD BE REVOKED WITHIN 90 DAYS IF AN ACCEPTABLE ENGINEERING DESIGN WAS NOT SUBMITTED TO NJDEP WITHIN 30 DAYS OF THE NOTICE. THE REQUESTED DESIGN WAS SUBMITTED, BUT WAS AGAIN REJECTED BY NJDEP IN APRIL OF 1977. AT THAT TIME, A NOTICE OF REGISTRATION REVOCATION WAS ISSUED, THEREBY INFORMING THE OWNER TO CEASE OPERATION OF THE LANDFILL.

HEARINGS ON THE REVOCATION OF THE LANDFILL REGISTRATION CONTINUED UNTIL EARLY 1981. ON MARCH 3, 1981, A GLOUCESTER COUNTY COURT ORDERED THE LANDFILL TO CEASE OPERATION EFFECTIVE MARCH 7, 1981. THE PREMISE FOR THE COURT-ORDERED CLOSURE WAS THAT THE LANDFILL HAD EXCEEDED ITS PERMITTED ELEVATIONS AND CAPACITY.

THROUGHOUT THE PERIOD FROM 1974 TO 1981 IT WAS ALLEGED BY AREA RESIDENTS THAT SPORADIC CHEMICAL DUMPING CONTINUED. NJDEP FILES AND OTHER REPORTS INDICATE MATERIALS CONTAINING HAZARDOUS SUBSTANCES WERE ALSO DISPOSED OF AT THE LANDFILL DURING THAT PERIOD.

PREVIOUS RESPONSE AND INVESTIGATION ACTIVITIES

DURING THE SUMMER AND FALL OF 1981, SEVERAL FIRES BROKE OUT AT THE LANDFILL. THE NJDEP WITH THE ASSISTANCE OF THE LOCAL FIRE DEPARTMENT TOOK ACTION AND EXTINGUISHED ALL FIRES BY NOVEMBER 1981.

FROM 1974 TO 1983, THE HELEN KRAMER LANDFILL HAS BEEN THE SUBJECT OF NUMEROUS INVESTIGATIONS AND STUDIES BY LOCAL HEALTH AUTHORITIES, THE NJDEP, EPA AND ITS CONSULTANTS, AND BY WEHRAN ENGINEERING CORPORATION (CONSULTANTS FOR HELEN KRAMER). HOWEVER, ALL OF THESE INVESTIGATIONS AND STUDIES WERE LIMITED IN THEIR SCOPE.

THE RESULTS OF THE PREVIOUS STUDIES HAVE DETERMINED:

- THE MT. LAUREL/WENONAH AQUIFER FLOWED FROM WEST TO EAST UNDER THE SITE.

- THE MT. LAUREL/WENONAH WAS CONTAMINATED WITH ORGANIC AND INORGANIC POLLUTANTS IN THE AREA BETWEEN THE LANDFILL AND EDWARDS RUN.

- NO RESIDENTIAL WELLS WERE FOUND TO BE IMPACTED BY THE LANDFILL, EXCEPT FOR ONE SHALLOW WELL LOCATED WITHIN 20 FEET OF THE REFUSE. THIS WELL WAS CLOSED BY THE GLOUCESTER COUNTY HEALTH DEPARTMENT.

- EDWARDS RUN WAS CONTAMINATED WITH ORGANIC AND INORGANIC POLLUTANTS. BIOASSAY AND AMES TESTING INDICATED EDWARDS RUN WAS BOTH TOXIC TO THE TEST SPECIES (BIOASSAY) AND MUTAGENIC ACCORDING TO THE AMES TEST.

- VOLATILE ORGANIC COMPOUNDS WERE FOUND IN THE AMBIENT AIR ON AND NEAR THE SITE. THE CONCENTRATIONS DID NOT INDICATE ANY IMMINENT THREAT TO NEARBY RESIDENTS. LANDFILL GAS, PRIMARILY METHANE, WAS DETECTED MIGRATING TO THE WEST IN THE UNSATURATED ZONE OF THE SOIL. NO RESIDENTIAL DWELLINGS WERE FOUND TO BE IMPACTED.

#ENF
ENFORCEMENT

IN JUNE OF 1981 AND JANUARY OF 1982, EPA SENT OUT INFORMATION REQUEST LETTERS PURSUANT TO SECTION 3007 OF RCRA, 42 U.S.C. SS6927, TO ELEVEN (11) POTENTIALLY RESPONSIBLE PARTIES (PRPS). THE PRPS INCLUDED THE OWNER (MRS. HELEN KRAMER), AS WELL AS SEVERAL GENERATORS AND TRANSPORTERS. THE PRPS RESPONDED THAT EITHER THEY DID NOT SEND HAZARDOUS WASTE TO THE HELEN KRAMER LANDFILL OR THAT WASTE WAS SENT TO THE SITE WITHOUT THEIR (GENERATORS) KNOWLEDGE AND/OR AUTHORIZATION.

NOTICE LETTERS TO CONDUCT THE RI/FS WERE SENT TO EIGHT (8) PRPS ON MARCH 16, 1983. NO PRPS RESPONDED TO THE NOTICE LETTERS.

NOTICE LETTERS OFFERING THE OPPORTUNITY TO CONDUCT THE REMEDIAL DESIGN AND IMPLEMENTATION OF THE PROPOSED REMEDIAL ACTION WERE SENT ON SEPTEMBER 6, 1985.

SITE GEOLOGY

GLOUCESTER COUNTY, NEW JERSEY, LIES WITHIN THE COASTAL PLAIN PHYSIOGRAPHIC PROVINCE OF THE EASTERN UNITED STATES. THE AREA IS UNDERLAIN BY UNCONSOLIDATED LAYERS OF SANDS AND CLAYS DEPOSITED IN A RELATIVELY EXTENSIVE HORIZONTAL SEQUENCE WITH A GENTLE SOUTHEASTERN DIP.

THE UNCONSOLIDATED FORMATIONS UNDERLYING THE KRAMER LANDFILL, FROM THE SURFACE DOWN, ARE; MOUNT LAUREL/ WENONAH, MARSHALLTOWN, ENGLISHTOWN, WOODBURY, MERCHANTVILLE, MAGOTHY/RARITAN. THE EDWARDS RUN STREAM VALLEY ALSO CONTAINS RECENTLY DEPOSITED ALLUVIUM (SEE FIGURE 4-1).

THE HELEN KRAMER LANDFILL AND ADJACENT AREAS ARE LOCATED WITHIN AN OUTCROP OF THE MOUNT LAUREL SAND AND WENONAH FORMATION, WHICH ARE MAPPED AS A SINGLE UNDIFFERENTIATED GEOLOGIC UNIT IN GLOUCESTER COUNTY DUE TO THEIR SIMILAR LITHOLOGY (HARDT AND HILTON, 1969). HEREAFTER, THE MOUNT LAUREL/WENONAH WILL BE REFERRED TO AS THE MOUNT LAUREL. THE UPPER MOUNT LAUREL SAND CONSISTS OF LIGHT-GRAY TO TAN, MEDIUM TO COARSE-GRAINED QUARTZ SAND WITH GLAUCONITE.

THE MOUNT LAUREL RANGES IN THICKNESS FROM 0 TO 65 FEET IN THE IMMEDIATE AREA OF THE SITE (SEE FIGURE 4-3). AN ANCIENT EDWARDS RUN REMOVED MOUNT LAUREL SAND TO FORM THE VALLEY IN WHICH THE STREAM NOW RESIDES. THE QUARRYING AND LANDFILLING OPERATIONS STRIPPED AWAY AN UNKNOWN QUANTITY OF THE MOUNT LAUREL PRIOR TO DISPOSAL ACTIVITIES. THE RECENT EDWARDS RUN ALLUVIUM IS AS MUCH AS 20 FEET THICK AND IS DEPOSITED IN THE CUT ERODED THROUGH THE MOUNT LAUREL/WENONAH AND PARTIALLY INTO THE TOP OF THE MARSHALLTOWN.

THE MARSHALLTOWN FORMATION UNDERLIES THE MOUNT LAUREL, AND IS REPORTED IN THE LITERATURE (HARDT AND HILTON, 1969; OWENS, 1969) TO HAVE A THICKNESS OF APPROXIMATELY 20 FEET. A 20 TO 55 FOOT THICK UNIT WAS ENCOUNTERED IN THIS INVESTIGATION AND TERMED MARSHALLTOWN. THE MARSHALLTOWN IN THE STUDY AREA IS COMPOSED OF MEDIUM TO DARK OLIVE-GRAY FOSSILIFEROUS AND MICACEOUS VERY FINE SILTY SAND AND SANDY TO CLAYEY SILT. SIX SUB-UNITS (MEMBERS) OF THE MARSHALLTOWN WERE OBSERVED AND CORRELATED UNDER THE SITE. THESE UNITS IN PAIRS COMPOSED THREE DISTINCT UPWARD-COARSENING SEQUENCES WHICH VARIED FROM SILTY SAND OR SANDY SILT CONTAINING CLAY IN THE BASAL MEMBER TO SILTY SAND WITH TRACES OF GRAVEL IN THE TOP MEMBER. EACH BORING ENCOUNTERED AN AVERAGE TOTAL OF 15 FEET OF STRATA CONTAINING CLAYEY MATERIAL IN THE MARSHALLTOWN. THE MARSHALLTOWN FORMATION IS INTERPRETED AS CONTINUOUS UNDER THE ENTIRE SITE AND SERVES AS A LEAKY CONFINING LAYER BETWEEN THE MOUNT LAUREL AND THE UNDERLYING ENGLISHTOWN FORMATIONS.

THE ENGLISHTOWN FORMATION IS A FINE TO COARSE-GRAINED QUARTZOSE, SOMETIMES MASSIVE CROSS-STRATIFIED SAND UNIT WITH LOCALIZED THIN TONGUES OF SILT IN THE SOUTHEAST PORTION OF THE STUDY AREA. IT IS INTERPRETED AS BEING CONTINUOUS UNDER THE SITE, RANGES IN THICKNESS BETWEEN 15 AND 30 FEET, AND EXHIBITS A MODERATE TO HIGH PERMEABILITY.

THE ENGLISHTOWN FORMATION IS UNDERLAIN BY THE RELATIVELY IMPERMEABLE WOODBURY CLAY AND MERCHANTVILLE FORMATIONS (COMBINED THICKNESS OF APPROXIMATELY 120 FEET) WHICH CREATE AN EFFECTIVE BARRIER BETWEEN THE ENGLISHTOWN AND THE MAGOTHY AND RARITAN FORMATIONS. DUE TO THIS BARRIER THE MAGOTHY AND RARITAN FORMATIONS ARE NOT CONSIDERED TO BE IMPACTED BY THE SITE AND THEREFORE WERE NOT EXTENSIVELY STUDIED.

THE REMEDIAL INVESTIGATION CONCENTRATED ON THE MOUNT LAUREL AND ENGLISHTOWN AQUIFERS. THE MOUNT LAUREL AQUIFER FLOWS EAST UNDER THE LANDFILL AND DISCHARGES TO EDWARDS RUN. SINCE EDWARDS RUN IS A GROUNDWATER BARRIER TO THE MOUNT LAUREL, THE GROUNDWATER (MOUNT LAUREL) ON THE EAST SIDE OF EDWARDS RUN FLOWS WEST AND ALSO DISCHARGES TO THE RUN. THE COEFFICIENT OF PERMEABILITY RANGES FROM 9 X 10-4 TO 2 X 10-2 CM/SEC. THE GROUNDWATER FLOW IN THE MOUNT LAUREL/WENONAH THROUGH THE SITE AREA AND DISCHARGING TO EDWARDS RUN IS APPROXIMATELY 80,000 GALLONS PER DAY (GPD) OR 55 GALLONS PER MINUTE (GPM).

NO MONITORING WELLS WERE SCREENED IN THE MARSHALLTOWN FORMATION SINCE IT IS NOT USED AS A WATER SUPPLY SOURCE. THE COEFFICIENT OF PERMEABILITY TENDS TO DECREASE WITH DEPTH AND RANGES FROM 1.92 X 10-4 TO 1.33 X 10-7 CM/SEC WITH VALUES OF 5 X 10-7 CM/SEC OR LESS IN MORE THAN HALF OF THE SAMPLES.

DUE TO THE PIEZOMETRIC HEADS IN THE MOUNT LAUREL AND THE ENGLISHTOWN, THE VERTICAL LEAKAGE FROM THE MOUNT LAUREL THROUGH THE MARSHALLTOWN INTO THE ENGLISHTOWN UNDER THE SITE IS ESTIMATED TO BE 10,000 GPD (7 GPM). IN THE AREA OF EDWARDS RUN, THE PIEZOMETRIC HEAD OF THE ENGLISHTOWN IS GREATER THAN THAT OF THE MOUNT LAUREL OR EDWARDS RUN. THEREFORE, VERTICAL LEAKAGE IS UP FROM THE ENGLISHTOWN THROUGH THE MARSHALLTOWN INTO THE EDWARDS RUN STREAM VALLEY AT AN ESTIMATED RATE OF 19,000 GPD (13 GPM)(SEE FIGURE 4-9).

THE ENGLISHTOWN FORMATION IS A CONFINED AQUIFER WHOSE PIEZOMETRIC SURFACE IS APPROXIMATELY 10 FT. ABOVE THE TOP OF THE MARSHALLTOWN. THE ENGLISHTOWN FLOWS EAST UNDER THE LANDFILL AND BEYOND EDWARDS RUN. BECAUSE THE ENGLISHTOWN IS CONFINED IT APPEARS UNAFFECTED BY EDWARDS RUN. THE HYDRAULIC GRADIENT ACROSS THE SITE AREA AND EDWARDS RUN APPEARS CONSTANT AND THE COEFFICIENT OF PERMEABILITY RANGES FROM 1.18 X 10-2 TO 4.22 X 10-3 CM/SEC. THE FLOW UNDER THE SITE AREA IS APPROXIMATELY 101,000 GPD (70 GPM).

REMEDIAL INVESTIGATION ACTIVITIES AND RESULTS

REMEDIAL INVESTIGATION ACTIVITIES

THE REMEDIAL INVESTIGATION ACTIVITIES PERTINENT TO THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS) ARE SUMMARIZED IN:

- DRAFT REMEDIAL INVEST REPORT AND FEASIBILITY STUDY OF ALTERNATIVES, HELEN KRAMER LANDFILL SITE, MANTUA TOWNSHIP, GLOUCESTER COUNTY, NEW JERSEY, R.E. WRIGHT ASSOCIATES INC., JULY 1985.

THE MAJOR PREVIOUS REMEDIAL INVESTIGATION ACTIVITIES IN THE ABOVE REPORT INCLUDE:

- AIR SAMPLING, OCTOBER 31 - NOVEMBER 2, 1983, BY THE NJDEP

- BIOASSAY AND AMES TESTING. MARCH AND JUNE 1981, AND AUGUST 1984, USEPA REGION II, TECHNICAL SUPPORT BRANCH.

AS PART OF THE RI/FS, A TREATABILITY STUDY TO DETERMINE THE EFFECTIVE TREATMENT ALTERNATIVES FOR THE LEACHATE HAS BEEN CONDUCTED AND IS UNDER REVIEW.

RESULTS

THE REMEDIAL INVESTIGATION HAS DETERMINED THAT THE MOUNT LAUREL AQUIFER IS HEAVILY CONTAMINATED (UP TO 400 MG/L TOTAL VOLATILE ORGANICS) WITH ORGANIC COMPOUNDS INCLUDING DICHLORO AND TRICHLORO-ETHANES AND ETHENES,

BENZENE, TOLUENE, XYLENES, KETONES, AND PHENOLS. INORGANIC CHEMICALS FOUND IN HIGH LEVELS IN THE MOUNT LAUREL INCLUDE ARSENIC, COBALT, IRON, MAGNESIUM, SODIUM, AND CALCIUM. INDICATOR PARAMETERS SUCH AS TOTAL ORGANIC CARBON (TOC), TOTAL ORGANIC HALIDES (TOX), AND CHEMICAL OXYGEN DEMAND (COD) WERE FOUND AT LEVELS AS HIGH AS 1200 MILLIGRAMS PER LITER (MG/L), 65 MG/L, AND 3900 MG/L, RESPECTIVELY. THE GROUNDWATER ANALYSIS DATA ARE ATTACHED AS APPENDIX I. ALL THE SAMPLING LOCATIONS ARE SHOWN IN FIGURE 1-3.

AS PREVIOUSLY DISCUSSED, THE MOUNT LAUREL IS DISCHARGING TO EDWARDS RUN. THE APPROXIMATE LIMIT OF THE CONTAMINATION IN THE MOUNT LAUREL IS SHOWN IN FIGURE 4-11. ALTHOUGH THE MOUNT LAUREL IS USED FOR DOMESTIC WATER SUPPLIES, BECAUSE OF THE EASTERLY FLOW ONLY ONE WELL MAY POTENTIALLY BE AFFECTED. THE OWNER MAINTAINS THE WELL IS NOT AFFECTED DUE TO ITS DEPTH. THE OWNER STATED ONLY THAT THE WELL WAS DEEP AND REFUSED TO ALLOW EPA'S CONTRACTORS TO SAMPLE THE WELL.

DURING THE DRILLING OF MONITORING WELL X-4D (ENGLISHTOWN WELL), GROSS ORGANIC VAPORS WERE FOUND EMANATING FROM THE DRILL CUTTINGS OF THE MARSHALLTOWN FORMATION. DRILL CUTTINGS OF THE MARSHALLTOWN WERE COLLECTED AND SENT TO A LABORATORY FOR ORGANIC CHEMICAL SCREENING BY GAS CHROMATOGRAPHY. THIS SCREENING SHOWED ORGANIC CONTAMINANTS HAD PENETRATED 40 FEET OF THE MARSHALLTOWN AT X-4 OR TO ABOUT 19 FEET FROM THE BOTTOM OF THE FORMATION. BASED ON THE COEFFICIENTS OF PERMEABILITY OF THE MARSHALLTOWN AND THE HYDRAULIC GRADIENT AT X-4, THE CONTAMINATED GROUNDWATER FROM THE MOUNT LAUREL SHOULD NOT HAVE PENETRATED 40 FEET OF THE MARSHALLTOWN, ASSUMING THE CONTAMINANTS MOBILITY IS THE SAME AS WATER. OTHER FACTORS, SUCH AS DIFFUSION OF CONTAMINANTS, DO EFFECT THE MOBILITY OF ORGANIC CHEMICALS; THEREFORE, ASSUMING THE CONTAMINANTS MOBILITY IS THE SAME AS WATER MAY BE AN OVERSIMPLIFICATION. RESEARCH HAS SHOWN THAT SOME ORGANIC CHEMICALS DO MIGRATE FASTER THAN WATER THROUGH VARIOUS STRATA. ANOTHER EXPLANATION FOR THE ORGANIC CONTAMINATION IN THE MARSHALLTOWN ARE THE BEDS OF HIGHER PERMEABILITY SILTY SANDS COUPLED WITH THE CONCEPTUAL VERTICAL FLOWS (FIGURE 4-7). UNDER THIS SCENARIO, THE CONTAMINANTS MAY HAVE ENTERED THE SILTY SAND OF THE MARSHALLTOWN WEST OF X-4 AND MIGRATED EAST HORIZONTALLY AND VERTICALLY DOWN INTO THE MARSHALLTOWN AT X-4.

TWO GROUNDWATER SAMPLES WERE COLLECTED ON THE SAME DAY FROM X-4D (ENGLISHTOWN). BOTH SAMPLES SHOWED TRANS-1,2,DICHLOROETHENE AT 5.5 AND 5.3 MICRO-GRAMS PER LITER (UG/L). TWO POSSIBLE EXPLANATIONS FOR THIS OBSERVATION WERE DISCUSSED IN THE REPORT. ONE IS THAT THE ANALYSIS HAS DETECTED THE FIRST SIGNS OF CONTAMINANT LEAKAGE THROUGH THE MARSHALLTOWN. THE SECOND EXPLANATION IS THAT CROSS-CONTAMINATION FROM THE MOUNT LAUREL TO THE ENGLISHTOWN MAY HAVE OCCURRED DURING DRILLING OPERATIONS. NO CONTAMINANTS ABOVE BACKGROUND WERE DETECTED IN ANY OF THE OTHER WELLS IN THE ENGLISHTOWN. DUE TO THE INCONSISTENCIES IN THE PHYSICAL DATA AND THE DIFFERENT POTENTIAL SOURCES OF THE CHEMICALS DETECTED THE REPORT CONCLUDES THAT THE DATA IS INSUFFICIENT TO MAKE ANY CONCLUSIONS CONCERNING THE CONTAMINATION OF THE ENGLISHTOWN AQUIFER. THE DATA, REGARDLESS OF THE INCONSISTENCIES, DOES SHOW A POTENTIAL FOR THE ENGLISHTOWN TO BE CONTAMINATED.

THE FLOW VELOCITY IN THE ENGLISHTOWN IS ESTIMATED TO BE 0.5 FEET PER DAY. THE ENGLISHTOWN AQUIFER IS USED AS A RESIDENTIAL WATER SUPPLY (AT LEAST 2 HOMES) AND POSSIBLY FOR IRRIGATION WITHIN ONE HALF MILE DOWNGRADIENT. MONITORING WELLS IN THE ENGLISHTOWN LOCATED BETWEEN THE SITE AND THE RESIDENTIAL WELLS DID NOT SHOW ANY CONTAMINATION. ASSUMING CONTAMINANTS ARE CURRENTLY ENTERING THE ENGLISHTOWN AND BASED ON THE FLOW VELOCITY, IT WOULD TAKE 7 MONTHS TO REACH A DOWNGRADIENT MONITORING WELL AND OVER 4 YEARS TO REACH THE NEAREST RESIDENTIAL WELL.

EDWARDS RUN IS ALSO HEAVILY CONTAMINATED WITH SIMILAR ORGANICS AND INORGANICS FOUND IN THE GROUND WATER, ALTHOUGH AT LOWER CONCENTRATION DUE TO DILUTION IN THE STREAM. EDWARDS RUN IS BEING CONTAMINATED BY BOTH SURFACE LEACHATE SEEPS AND UNDERGROUND DISCHARGES. PREVIOUS BIOASSAY AND AMES TESTING OF THE LEACHATE ENTERING EDWARDS RUN (1981) SHOWED THE LEACHATE WAS BOTH TOXIC AND MUTAGENIC RESPECTIVELY, TO THE TEST SPECIMENS. BIOASSAY AND AMES TESTING IN 1984 SHOWED SIMILAR RESULTS.

A THREE DAY, TWENTY-FOUR HOUR AIR SAMPLING PROGRAM WAS CONDUCTED BY THE NJDEP FROM OCTOBER 31 TO SEPTEMBER 2, 1983. THE RESULTS SHOWED SIGNIFICANT CONCENTRATIONS OF VINYLIDENE CHLORIDE (1,1, DICHLOROETHENE), BENZENE, 1,2-DIBROMOETHANE, AND TOLUENE. AS PART OF EPA'S HEALTH AND SAFETY MONITORING AT THE SITE, GROSS ORGANIC VAPOR ANALYSES OF THE GASES DISCHARGING FROM NATURAL VENTS IN THE LANDFILL SHOWED SPORADIC LEVELS OF ORGANIC CHEMICALS. THE ORGANIC VAPOR CONCENTRATIONS RANGED FROM 0 PPM TO OVER 300 PPM DURING AN ATTEMPT TO DRILL THROUGH THE LANDFILL.
LANDFILL GAS MIGRATION, PRIMARILY METHANE, WAS INVESTIGATED USING AN ORGANIC VAPOR ANALYZER (OVA). THIS STUDY INDICATED LANDFILL GAS IS MIGRATED IN THE UNSATURATED ZONE OF THE MOUNT LAUREL FORMATION ABOUT 200 FEET

TO THE WEST IN THE SOUTHERN END OF THE LANDFILL. FIGURE 6-1 SHOWS THE APPROXIMATE EXTENT OF THE GAS MIGRATION. LANDFILL GASES ARE ALSO BEING DISCHARGED TO THE ATMOSPHERE THROUGH NATURAL VENTS OR CRACKS IN THE SURFACE OF THE LANDFILL. METHANE CONCENTRATIONS AT THESE VENTS WERE FOUND AT EXPLOSIVE LEVELS AT THE VENT OPENINGS, BUT THE CONCENTRATIONS FELL BELOW EXPLOSIVE LEVELS WITHIN A FEW FEET FROM THE VENT.

THE REMEDIAL INVESTIGATION ALSO NOTED SEVERAL AREAS OF EXPOSED WASTES WITH PROTRUDING SHARP OBJECTS, STEEP SLOPES AND RIFTS, AS WELL AS CRACKS IN THE SURFACE. THESE CONDITIONS PRESENT PHYSICAL HAZARDS TO ANYONE WALKING ON THE LANDFILL.

ADDITIONAL REMEDIAL INVESTIGATIONS WERE CONCERNED MAINLY WITH THE SURFACE LEACHATE. IN ORDER TO DETERMINE THE AMOUNT OF LEACHATE BEING GENERATED, SEVERAL MATHEMATICAL CALCULATIONS TOGETHER WITH DIRECT OBSERVATIONS WERE USED. THE RESULTS ARE GRAPHICALLY PRESENTED IN FIGURE 4-9. THE ESTIMATED AVERAGE ANNUAL FLOW OF LEACHATE TO EDWARDS RUN IS 124 GPM (179,000 GPD). FLOW THROUGH THE MOUNT LAUREL IS 55 GPM AND INFILTRATION FROM PRECIPITATION THROUGH THE FILL IS 65 GPM. INFILTRATION THROUGH THE AREA BETWEEN EDWARDS RUN AND THE FILL IS 11 GPM AND LEAKAGE THROUGH THE MARSHALLTOWN IS 7 GPM. THE AVERAGE LEACHATE/GROUNDWATER CONTAMINANT CONCENTRATIONS WERE ESTIMATED TO BE APPROXIMATELY 130 MG/L TOTAL ORGANICS WITH A TOC OF 236 MG/L, COD OF 326 MG/L AND TOX OF 8.2 MG/L. THE AVERAGE ESTIMATED CONCENTRATIONS OF INORGANICS INCLUDED ARSENIC 0.06 MG/L, CHROMIUM 5.4 MG/L (TOTAL), LEAD 0.197 MG/L, IRON 300 MG/L AND NICKEL 5.4 MG/L.

RISK ASSESSMENT

TO ASSIST IN DETERMINING THE IMPACT OF THE LANDFILL ON THE PUBLIC HEALTH AND ENVIRONMENT, A RISK ASSESSMENT WAS PERFORMED FOR THE CONDITIONS AT THE SITE. WHERE POSSIBLE, RELEVANT STANDARDS WERE USED TO ASSESS THE IMPACT OF THE SITE. IN MOST CASES NO STANDARDS EXIST AND RELEVANT OR APPLICABLE CRITERIA AND GUIDANCE MUST BE USED.

RELEVANT STANDARDS FOR AIR BORNE CONTAMINANTS HAVE BEEN DEVELOPED FOR THE WORK PLACE. THE AMBIENT MEASURED OR CALCULATED CONCENTRATION OF AIR CONTAMINANTS AT THE LANDFILL DO NOT EXCEED THE WORKPLACE STANDARDS. FOR SOME COMPOUNDS THE WORK PLACE THRESHOLD LIMIT VALUE (TLV) HAS BEEN USED TO DEVELOP A GUIDANCE LEVEL FOR NON-WORKPLACE EXPOSURE. THE CONCENTRATIONS OF 1,1-DICHLOROETHENE AND TOLUENE, AT THE SITE EXCEED THESE GUIDANCE LEVELS. THE POTENTIAL INCREASED CANCER RISK DUE TO AIR-BORNE CONTAMINANTS FROM THE SITE IS ESTIMATED TO BE IN EXCESS OF 1 X 10-6 UP TO A DISTANCE OF 5 MILES FROM THE SITE.

SEVERAL OF THE MAXIMUM OBSERVED CONCENTRATIONS OF CONTAMINANTS IN EDWARDS RUN ALSO EXCEEDED THE WATER QUALITY CRITERIA FOR SURFACE WATER DEVELOPED PURSUANT TO THE CLEAN WATER ACT. FOR THE INORGANICS, ONLY NICKEL EXCEEDS THE GUIDANCE, AND FOR THE ORGANICS, 7 OF 18 EXCEEDED THE GUIDANCE. THESE INCLUDE CHLOROFORM, BENZENE, AND SEVERAL CHLORINATED ETHENES. THE POTENTIAL INCREASED CANCER RISK FOR INGESTION OF EDWARDS RUN IS ESTIMATED TO BE 3.5 X 10-3.

THE NJDEP HAS DEVELOPED PRELIMINARY DISCHARGE CRITERIA FOR THE GROUNDWATER/LEACHATE DISCHARGE FROM THE SITE TO EDWARDS RUN. THESE CRITERIA CAN BE USED TO HELP DETERMINE WHAT COULD BE CONSIDERED ACCEPTABLE CONTAMINANT LEVELS IN THE DISCHARGE. THE AVERAGE CONCENTRATIONS OF CONTAMINANTS IN THE DISCHARGE EXCEED TWELVE OF THE STATE'S CRITERIA, INCLUDING BENZENE, ARSENIC, BOD, COD AND TOC.

IN GENERAL, THE LEACHATE ENTERING EDWARDS RUN IS CONSIDERED TO HAVE RENDERED THE STREAM UNUSABLE FOR THE DESIGNATED USES OF AN FW-2 NON-TROUT SURFACE WATER.

SCREENING OF REMEDIAL ACTION TECHNOLOGIES

TABLE 11-1 SUMMARIZES THE PROBLEMS AND POTENTIAL EXPOSURE PATHWAYS IDENTIFIED DURING THE REMEDIAL INVESTIGATION. THE GOAL OF THE REMEDIAL ACTION AT THE HELEN KRAMER LANDFILL IS TO PREVENT OR MITIGATE THE MIGRATION OF HAZARDOUS SUBSTANCES.

A COMPREHENSIVE LIST OF REMEDIAL TECHNOLOGIES APPLICABLE TO UNCONTROLLED HAZARDOUS WASTE SITES WAS EVALUATED. THE SCREENING PROCEDURE EVALUATED THE TECHNOLOGICAL APPLICABILITY AND CONSTRAINTS, THE PUBLIC HEALTH AND ENVIRONMENTAL EFFECTS, INSTITUTIONAL CONSTRAINTS, AND ORDER OF MAGNITUDE COSTS. THE RESULTS OF THE SCREENING PRODUCED FEASIBLE REMEDIAL ACTION TECHNOLOGIES THAT THEN WERE COMBINED INTO REMEDIAL ALTERNATIVE COMPONENTS.

REMEDIAL ALTERNATIVE COMPONENTS

SECURITY FENCE

INSTALLATION OF A SECURITY FENCE WOULD CONTROL ACCESS TO THE SITE AND SUBSTANTIALLY REDUCE THE HAZARD OF DIRECT CONTACT WITH WASTE MATERIALS.

THE FENCE WOULD BE 6 FOOT HIGH CHAIN LINK AND WOULD SURROUND THE SITE.

GROUNDWATER/LEACHATE COLLECTION TRENCH

ONE METHOD TO PREVENT LEACHATE FROM ENTERING EDWARDS RUN WOULD BE TO INSTALL A GROUNDWATER/LEACHATE COLLECTION TRENCH ALONG THE ENTIRE EASTERN BORDER OF THE SITE. A TRENCH WOULD BE EXCAVATED DOWN INTO THE MARSHALLTOWN FORMATION. A PERFORATED PVC PIPE WOULD THEN BE PLACED IN THE TRENCH TO CHANNEL THE LEACHATE TO A COLLECTION POINT. THE TRENCH COULD THEN BE BACKFILLED WITH GRAVEL AND SEALED TO PREVENT SURFACE INFILTRATION. THE TRENCH WOULD BE EQUIPPED WITH MANHOLES FOR MAINTENANCE AND LIFT PUMPS TO REMOVE THE LEACHATE. THE PUMPS CAN ALSO BE USED TO MAINTAIN A LEACHATE LEVEL IN THE TRENCH THAT WOULD MINIMIZE INFILTRATION INTO THE TRENCH OF CLEAN SURFACE WATER FROM EDWARDS RUN. A DOWNGRADIENT SLURRY WALL COULD ALSO BE INSTALLED TO PREVENT THE SURFACE WATER FROM INFILTRATING INTO THE TRENCH. ANOTHER METHOD, PUMPING WELLS, WAS CONSIDERED BUT WAS ELIMINATED BECAUSE THE AQUIFER CHARACTERISTICS PREVENT THE WELLS FROM FORMING AN EFFECTIVE CONE OF DEPRESSION.

UPGRADIENT SOIL-BENTONITE SLURRY WALL

A MEANS TO MITIGATE THE RELEASE OF HAZARDOUS SUBSTANCES TO EDWARDS RUN AND TO MITIGATE THE POTENTIAL FOR CONTAMINATION OF THE ENGLISHTOWN AQUIFER IS TO INSTALL AN UPGRADIENT SLURRY WALL. THE WALL WOULD SUBSTANTIALLY REDUCE THE GROUNDWATER FLOWING UNDER THE SITE IN THE MOUNT LAUREL FORMATION FROM 55 GPM TO APPROXIMATELY 4 GPM. REDUCING THE GROUNDWATER FLOW ALSO REDUCES THE PIEZOMETRIC SURFACE OF THE MOUNT LAUREL AQUIFER. THIS SUBSTANTIALLY REDUCES THE POTENTIAL FOR DOWNWARD VERTICAL MIGRATION THROUGH THE MARSHALLTOWN INTO THE ENGLISHTOWN. THE RESULTING FLOW REDUCTION WOULD ALSO DECREASE THE LEACHATE QUANTITIES TO BE TREATED.

THE SLURRY WALL WOULD BE CONSTRUCTED ON THE WEST, NORTH, AND SOUTH SIDES OF THE LANDFILL. THE WALL WOULD BE THREE FEET THICK AND EXTEND FROM THE GROUND SURFACE DOWN TO AND KEYED INTO THE MARSHALLTOWN (ABOUT 60 FEET ON THE WEST SIDE). THE WALL WOULD BE PLACED ABOUT 15 FEET OUTSIDE OF THE EXISTING WASTE DEPOSITION LIMIT.

SURFACE GRADING AND CAPPING

SURFACE GRADING AND CAPPING WOULD CONSIST OF FILLING AREAS OF THE SITE WITH LOCAL BORROW AND GRADING THE SOIL TO A MAXIMUM 20% SLOPE. THE CAP WILL SERVE TO PREVENT DIRECT CONTACT WITH THE EXPOSED WASTE, ASSIST IN GAS EMISSION CONTROL, ELIMINATE THE STEEP SLOPES AND RIFTS, AND MOST IMPORTANTLY REDUCE THE AMOUNT OF LEACHATE GENERATED BY PROMOTING RUNOFF OF PRECIPITATION, RATHER THAN PERCOLATION.

THE REDUCTION IN PERCOLATION IS DEPENDENT PRIMARILY ON THE MATERIAL WHICH COMPOSES THE CAP. THREE CAPPING TECHNOLOGIES WERE EVALUATED, INCLUDING: A RCRA CAP COMPOSED OF CLAY, SYNTHETIC LINER, AND SOIL; A CLAY CAP COMPOSED OF CLAY AND SOIL; AND A SOIL CAP ONLY.

THE RCRA CAP WAS ELIMINATED IN THE INITIAL SCREENING FOR TECHNICAL FEASIBILITY REASONS. RECOMMENDED SLOPES FOR RCRA CAPS RANGE FROM 3 TO 5%. WITH SLOPES AT THE SITE OF 20%, THE MATERIAL PLACED ON THE SYNTHETIC LINER (DRAINAGE LAYER AND TOPSOIL) WOULD HAVE A HIGH POTENTIAL FOR SLOPE FAILURE, AND THEREFORE THE RCRA CAP WAS CONSIDERED UNRELIABLE. IN ADDITION, THE EXPECTED DIFFERENTIAL SETTLING OF THE LANDFILL COULD RIP THE LINER AND SUBSTANTIALLY REDUCE THE EFFECTIVENESS OF THE CAP. IDENTIFYING AND REPAIRING THESE RIPS WOULD BE A SIGNIFICANT MAINTENANCE PROBLEM.

DIFFERENT CAPPING MATERIALS WERE EVALUATED USING EPA'S HELP MODEL. A CLAY CAP WOULD BE EXPECTED TO REDUCE PERCOLATION THROUGH THE FILL FROM 65 GPM CURRENTLY TO 0.5 GPM, A 99.2% REDUCTION. THE SLOPES ARE NOT EXPECTED TO ADVERSELY AFFECT THE CLAY CAP. DIFFERENTIAL SETTLEMENT WOULD ALSO AFFECT THE CLAY CAP, BUT

MAINTENANCE OF THE CLAY CAP WOULD NOT BE AS SIGNIFICANT AS THE RCRA CAP.

A SOIL CAP WOULD BE EXPECTED TO REDUCE PERCOLATION BY 46% TO 35 GPM. MAINTENANCE FROM DIFFERENTIAL SETTLEMENT WOULD BE LESS THAN BOTH THE RCRA AND CLAY CAPS AND WOULD BE SIGNIFICANTLY LESS IN CAPITAL COSTS THAN THE OTHER TWO CAPS.

THE CLAY CAP WOULD CONSIST OF A VARIABLE THICKNESS OF LOCAL BORROW ON THE WASTE, ONE FOOT OF GRAVEL FOR GAS VENTING, TWO FEET OF CLAY (10-7 CM/SEC PERMEABILITY), A ONE FOOT SAND DRAINAGE LAYER, EIGHTEEN INCHES OF LOCAL BORROW AND SIX INCHES OF TOP SOIL. THE CAP IS THEN VEGETATED TO REDUCE EROSION. A SOIL CAP CONSISTS OF THE SAME MATERIAL AS THE CLAY CAP, EXCEPT FOR THE CLAY. IN THE ALTERNATIVES THAT CONTAIN A GROUNDWATER/LEACHATE COLLECTION SYSTEM AND/OR AN UPGRADIENT SLURRY WALL, THE CAP IS ENVISIONED TO EXTEND FROM THE REFUSE LIMIT TO THE ADDITIONAL COMPONENT.

LEACHATE TREATMENT

THIS REMEDIAL ALTERNATIVE COMPONENT WOULD BE IMPLEMENTED IN CONJUNCTION WITH THE LEACHATE COLLECTION TRENCH. ONCE COLLECTED THE LEACHATE WOULD REQUIRE TREATMENT PRIOR TO ULTIMATE DISCHARGE TO A SURFACE WATER BODY. SEVERAL TREATMENT TECHNOLOGIES WERE EVALUATED. BASED ON THE CHARACTERISTICS OF THE LEACHATE, THE FOLLOWING TECHNOLOGIES WERE CONSIDERED FEASIBLE FOR TREATMENT OF THE LEACHATE:

- FLOW EQUALIZATION - A BASIN DESIGNED TO STORE PEAK FLOWS WHICH ALLOW THE TREATMENT SYSTEM TO OPERATE AT A CONSTANT FLOW FOR MORE EFFECTIVE TREATMENT, AND FOR STORAGE DURING MAINTENANCE SHUT-DOWNS.

- PRECIPITATION, FLOCCULATION AND SEDIMENTATION - THESE TECHNOLOGIES REMOVE SUSPENDED SOLIDS AND SOLUBLE HEAVY METALS. IT INVOLVES THE ADDITION OF LIME OR CAUSTIC TO RAISE THE PH TO ABOUT 8.0 TO PRECIPITATE MOST OF THE HEAVY METALS. ANIONIC POLYMERS ARE THEN ADDED TO FLOCCULATE AND AGGLOMERATE SUSPENDED SOLIDS. THESE PROCESSES ARE FOLLOWED BY SEDIMENTATION IN A CLARIFIER, TO SEPARATE THE PRECIPITATES FROM THE WASTE WATER.

- AIR STRIPPING - THE AIR STRIPPING EFFECTIVELY REMOVES VOLATILE ORGANIC COMPOUNDS FROM THE LEACHATE. THIS TECHNIQUE FOR REMOVING THESE COMPOUNDS WAS RETAINED OVER ACTIVATED CARBON ADSORPTION DUE TO ITS LOWER COST WITH COMPARABLE, BUT LESS EFFICIENCY. THE PROCESS INVOLVES PASSING AIR THROUGH A PACKED COLUMN OF HIGHLY POROUS MEDIA AND PASSING THE LEACHATE DOWN THE COLUMN, AGAINST THE AIR FLOW. THE VOLATILE CHEMICALS ARE STRIPPED FROM THE WATER AND EXHAUSTED WITH THE AIR. THE AIR STRIPPER MAY NEED ADDITIONAL TREATMENT OF THE OFF-GAS IN ORDER TO COMPLY WITH AIR POLLUTION DISCHARGE CRITERIA. IF TREATMENT IS NECESSARY IT WOULD INVOLVE VAPOR PHASE ACTIVATED CARBON TO ADSORB THE VOLATILE CHEMICALS FROM THE OFF-GAS.

AT THIS POINT IN THE TREATMENT PROCESS, IT MAY BE POSSIBLE TO DISCHARGE THE EFFLUENT FROM THE AIR STRIPPER TO THE GLOUCESTER COUNTY UTILITIES AUTHORITY (GCUA) SEWER SYSTEM FOR FINAL TREATMENT AT GCUA'S ACTIVATED SLUDGE TREATMENT PLANT.

IF THIS PRETREATMENT COMPONENT IS NOT IMPLEMENTABLE, EITHER TECHNICALLY OR INSTITUTIONALLY, THE TREATMENT PROCESS WOULD CONTINUE IN ORDER TO OBTAIN AN EFFLUENT QUALITY SUITABLE FOR DIRECT DISCHARGE TO EDWARDS RUN. THIS COMPONENT WILL BE THE FULL TREATMENT OPTION AND IS EXPECTED TO INVOLVE THE FOLLOWING ADDITIONAL TREATMENT METHODS:

- ACTIVATED SLUDGE - BIOLOGICAL TREATMENT COULD BE USED TO REMOVE A LARGE PORTION OF THE REMAINING ORGANIC CONTAMINANTS FROM THE LEACHATE. ACTIVATED SLUDGE WAS CHOSEN OVER OTHER BIOLOGICAL TREATMENTS DUE TO ITS ADAPTABILITY TO FLUCTUATING LOADINGS. THE BASIC ACTIVATED SLUDGE PROCESS INVOLVES DEGRADING THE ORGANIC CONTAMINANTS WITH MICROORGANISMS. THE SYSTEM IS AERATED TO PROVIDE OXYGEN FOR THE PROCESS. THE AERATION TANK IS FOLLOWED BY A FINAL CLARIFIER TO SEPARATE THE SLUDGE CONTAINING THE MICROORGANISMS FROM THE LEACHATE (WASTE WATER). A PORTION OF THE SLUDGE IS THEN RECIRCULATED BACK TO THE AERATION TANK AND THE WASTE WATER CONTINUES IN THE TREATMENT SYSTEM.

- FILTRATION - THE TWO PART FILTRATION PROCESS SERVES TO "POLISH" THE WASTE WATER TO REMOVE ANY RESIDUAL SUSPENDED SOLIDS AND ORGANIC CHEMICALS. THE FIRST FILTER, A DUAL MEDIA FILTER, WILL REMOVE ANY SUSPENDED SOLIDS NOT REMOVED BY THE FINAL CLARIFIER PRIMARILY TO PREVENT CLOGGING IN THE SECOND, ACTIVATED CARBON, FILTER. PREVENTING CLOGGING IN THE CARBON FILTER IMPROVES ITS EFFECTIVENESS. THE CARBON FILTER WOULD REMOVE ANY TRACE ORGANIC CHEMICALS REMAINING.

- CHLORINATION - THIS TREATMENT STEP COULD BE UTILIZED TO DISINFECT THE WASTE WATER IF NECESSARY.

THE TREATABILITY STUDY CURRENTLY UNDER REVIEW WILL MORE SPECIFICALLY DEFINE THE NECESSARY TREATMENT UNITS.

GAS GENERATION/MIGRATION AND TREATMENT

IN ORDER TO PREVENT OFF-SITE UNDERGROUND MIGRATION OF LANDFILL GAS PRIMARILY METHANE) AND TO CONTROL THE RELEASE OF LANDFILL GAS THROUGH THE LANDFILL SURFACE, TWO TYPES OF GAS CONTROLS WERE EVALUATED AND RETAINED. GAS CONTROL IS ALSO AN INTEGRAL PART OF THE LANDFILL CAP. IF UNCONTROLLED, THE PRESSURE FROM THE GAS COULD CAUSE CRACKS IN THE CAP, ADVERSELY AFFECT THE INTEGRITY OF A CLAY CAP, AND INCREASE LATERAL MIGRATION OFF-SITE. THE PAST FIRES AT THE SITE ALSO INDICATE THE NEED FOR GAS CONTROL.

A PASSIVE GAS VENTILATION SYSTEM UTILIZES THE GRAVEL LAYER IN THE CAP TO CHANNEL THE GAS TO THE VENTS. APPROXIMATELY 1,200 VENTS WOULD BE PLACED ON A 50 SQUARE FOOT GRID SYSTEM. THE VENTS WOULD BE 4 INCH PVC PIPES PLACED THROUGH THE CAP AND PERFORATED FROM THE GRAVEL LAYER DOWN TO THE WASTE. THE VENTS WOULD EXTEND TO ABOVE GROUND LEVEL. THE VENTS MAY HAVE TO BE EQUIPPED WITH SOME TYPE OF TREATMENT, DEPENDING ON THE CONCENTRATIONS AND CONSTITUENTS OF THE GASES BEING VENTED.

ACTIVE GAS VENTILATION WOULD UTILIZE THE GRAVEL LAYER IN THE CAP WITH 88 VENTS THROUGH THE CAP ON A 200 FOOT GRID. THE VENTS WOULD BE PERFORATED FROM THE GRAVEL LAYER DOWN TO THE WASTE. THE VENTS WOULD BE CONNECTED BY A HEADER PIPE ON THE GROUND SURFACE AND BE EQUIPPED WITH FLEXIBLE JOINTS TO AVOID BREAKAGE FROM DIFFERENTIAL SETTLING. THE HEADER SYSTEM WOULD BE CONNECTED TO BLOWERS, WHICH WOULD WITHDRAW THE GAS AND IN TURN FORCE THE GAS INTO A GAS TREATMENT SYSTEM.

THE LEVELS OF GROSS ORGANIC VAPORS PERIODICALLY FOUND IN THE LANDFILL GAS INDICATE A STRONG POTENTIAL FOR THE GAS TO CONTAIN SIGNIFICANT QUANTITIES OF VOLATILE ORGANICS. BASED ON OTHER AIR ANALYSES THERE IS A POTENTIAL FOR THESE VOLATILE ORGANICS TO CAUSE OFFSITE CANCER RISKS GREATER THAN 1 X 10-6. THE GAS TREATMENT SYSTEM WOULD CONSIST OF VAPOR PHASE CARBON UNITS TO REMOVE VOLATILE ORGANIC CHEMICALS, FOLLOWED BY METHANE FLARING.

ALTHOUGH BOTH SYSTEMS ALLOW FOR PROPER VENTILATION OF THE GASES, THE ACTIVE GAS SYSTEM WOULD PROVIDE THE GREATEST ASSURANCE AGAINST THE POSSIBILITY OF FIRES RECURRING AT THE SITE. DUE TO THE METHANE HAZARD, AN ACTIVE GAS VENTILATION SYSTEM WAS RECOMMENDED DURING CONSTRUCTION OF THE CAP. THE SHORT-TERM ACTIVE GAS SYSTEM COULD THEN BE EASILY INTEGRATED INTO THE LONG-TERM SYSTEM.

NEW JERSEY REGULATIONS REQUIRE AN ACTIVE GAS VENTILATION SYSTEM WHEN OFF-SITE MIGRATION OF METHANE PRESENTS A PROBLEM. AS A GUIDE, THE NJDEP CONSIDERS THAT AN OFF-SITE METHANE CONCENTRATION GREATER THAN 25% OF THE LOWER EXPLOSIVE LIMIT (LEL) WOULD REQUIRE AN ACTIVE GAS COLLECTION SYSTEM TO BE INSTALLED.

EXCAVATION

EXCAVATION IS CONSIDERED TO BE A VERY EFFECTIVE TECHNOLOGY TO MITIGATE THE CONTINUED GENERATION OF LEACHATE. THE DISADVANTAGES OF EXCAVATION AT THIS SITE INCLUDE: A SIGNIFICANT SAFETY HAZARD TO THE WORKERS AND THE SURROUNDING POPULATION, THE LACK OF SUFFICIENT CAPACITY IN EXISTING SECURE LANDFILLS FOR DISPOSAL OF APPROXIMATELY 2 MILLION CUBIC YARDS OF WASTE, AND THE HIGH COST OF THAT DISPOSAL. THIS TECHNOLOGY WAS, HOWEVER, RETAINED TO BE USED IN CONJUNCTION WITH THE ALTERNATIVE TO BE DEVELOPED TO COMPLY WITH EPA GUIDANCE CONCERNING OFF-SITE TREATMENT STORAGE AND DISPOSAL.

CONSTRUCTION OF AN ON-SITE RCRA FACILITY

THIS COMPONENT INVOLVES CONSTRUCTION OF A SECURE HAZARDOUS WASTE LANDFILL ADJACENT TO THE SITE THAT CONFORMS

TO THE REGULATIONS PROMULGATED UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA). THIS RCRA LANDFILL WOULD SERVE AS THE DISPOSAL FACILITY OF THE WASTE EXCAVATED. IT WOULD INVOLVE CONSTRUCTION OF THREE INDIVIDUAL CELLS WITH DOUBLE LINERS AND RCRA CAPS.

A GROUNDWATER COLLECTION AND TREATMENT SYSTEM WOULD BE INSTALLED TO COLLECT AND TREAT THE LEACHATE DURING EXCAVATION, AND REMOVE ANY RESIDUAL CONTAMINATION FROM THE SOIL AFTER EXCAVATION. THE TREATMENT PLANT WOULD THEN BE AVAILABLE TO TREAT ANY LEACHATE THAT WOULD BE COLLECTED BY THE DOUBLE LINER SYSTEM IN THE RCRA FACILITY.

THIS COMPONENT HAS AN EXTREMELY HIGH COST AS WELL AS SIGNIFICANT SAFETY PROBLEMS ASSOCIATED WITH EXCAVATION.

LAGOON DEWATERING AND EXCAVATION

THIS COMPONENT INVOLVES REMEDIATION OF THE NORTH LAGOON AND THE TWO LEACHATE COLLECTION PONDS. THE LAGOONS CONTAIN APPROXIMATELY 1.52 MILLION GALLONS OF LEACHATE AND AN ESTIMATED 2400 YD3 OF HIGHLY CONTAMINATED SOIL/SEDIMENT. THE SOIL WOULD BE PLACED ON THE LANDFILL UNDER THE CAP. THE LEACHATE WOULD BE DISPOSED OF AT A NEARBY (LT 25 MI.) PERMITTED TREATMENT FACILITY OR RECIRCULATED THROUGH THE FILL AND THEN COLLECTED AND TREATED BY THE LEACHATE COLLECTION TRENCH AND TREATMENT SYSTEM. THE LAGOON WOULD THEN BE FILLED WITH LOCAL BORROW.

SURFACE WATER CONTROLS

THE SURFACE WATER CONTROLS ARE AN INTEGRAL PART OF THE LANDFILL CAP.

THIS COMPONENT CONSISTS OF STORM WATER RUNOFF CONTROLS, TO PROTECT THE CAP FROM EROSION AND PROMOTE RUNOFF, AND RELOCATING APPROXIMATELY 600 FEET OF EDWARDS RUN NEAR THE SOUTH LOBE OF THE LANDFILL.

THE STORM WATER RUNOFF CONTROLS WOULD INVOLVE A SERIES OF CHANNELS ON THE CAP TO DIRECT THE RUNOFF TO RETENTION BASINS, WHICH DISCHARGE TO NEARBY SURFACE WATERS. THE RETENTION BASINS STORE THE WATER TO ALLOW FOR A CONTROLLED DISCHARGE WHICH HELPS PROTECT EROSION AT THE RECEIVING STREAM.

THE RELOCATION OF EDWARDS RUN IS NECESSARY IN ORDER TO EXTEND THE CAP OUT TO ACHIEVE THE DESIRED SLOPE. A 600 FOOT LONG PORTION OF EDWARDS RUN NEAR THE SOUTH LOBE WILL BE RELOCATED BY CONSTRUCTING A NEW STREAM CHANNEL ABOUT 100 FEET EAST OF THE EXISTING CHANNEL.

THESE CONTROLS UTILIZE ESTABLISHED CONSTRUCTION TECHNOLOGIES AND ARE RELATIVELY EASILY IMPLEMENTABLE AND RELIABLE. RELOCATING EDWARDS RUN WOULD MOST LIKELY REQUIRE COMPLIANCE WITH STATE STREAM ENCROACHMENT REGULATIONS.

ALTERNATE WATER SUPPLY

THIS COMPONENT WOULD ESSENTIALLY ELIMINATE THE LOW POTENTIAL FOR RESIDENTIAL WELLS TO BECOME CONTAMINATED. IT INVOLVES EITHER DRILLING NEW WELLS TO THE UNTHREATENED RARITAN MAGOTHY AQUIFER AND/OR EXTENDING MUNICIPAL WATER SUPPLY MAINS FROM EAST GREENWICH TOWNSHIP DOWN JESSUPS MILL AND BOODY MILL ROAD INTO MANTUA TOWNSHIP. THE WATER MAINS CURRENTLY EXTEND TO THE TOWNSHIP BORDER ADJACENT TO THE SITE.

MONITORING

THIS COMPONENT WOULD INVOLVE QUARTERLY MONITORING OF SIX EXISTING AND ONE NEW SHALLOW WELLS, TWO EXISTING AND 4 NEW DEEP WELLS, TWO SURFACE WATER LOCATIONS, AND AIR SAMPLES UPWIND, ONSITE, AND DOWNWIND.

REMEDIAL ALTERNATIVES

THE REMEDIAL ALTERNATIVE COMPONENTS WERE COMBINED TO FORM REMEDIAL ACTION ALTERNATIVES IN FIVE CATEGORIES TO COMPLY WITH EPA GUIDANCE. OUTLINED BELOW ARE THE REMEDIAL ALTERNATIVES DEVELOPED FOR THE COST-EFFECTIVE ANALYSIS.

ALTERNATIVE #1 (NO ACTION)

- SECURITY FENCE
- MONITORING

ALTERNATIVE #2

- RCRA LANDFILL ADJACENT TO SITE
- EXCAVATION AND DISPOSAL IN THE ON-SITE RCRA LANDFILL
- GROUNDWATER/LEACHATE COLLECTION AND TREATMENT
- DEWATER, EXCAVATE AND FILL LAGOONS
- SECURITY FENCE
- MONITORING

ALTERNATIVE #3

- CLAY CAP
- GROUNDWATER/LEACHATE COLLECTION TRENCH AND TREATMENT
  - PRETREATMENT
  - COMPLETE TREATMENT
- PASSIVE GAS VENTILATION
- DEWATER, EXCAVATE, AND FILL LAGOONS
- SURFACE WATER CONTROLS
- SECURITY FENCE
- MONITORING

ALTERNATIVE #4

- CLAY CAP
- GROUNDWATER/LEACHATE COLLECTION TRENCH AND TREATMENT
  - PRETREATMENT
  - COMPLETE TREATMENT
- ACTIVE GAS VENTILATION
- UPGRADIENT SLURRY WALL
- DEWATER, EXCAVATE, AND FILL LAGOONS
- SURFACE WATER CONTROLS
- SECURITY FENCE
- MONITORING

ALTERNATIVE #5A

- CLAY CAP
- PASSIVE GAS VENTILATION
- UPGRADIENT SLURRY WALL
- DEWATER, EXCAVATE, AND FILL LAGOONS
- SURFACE WATER CONTROLS
- SECURITY FENCE
- MONITORING

ALTERNATIVE #5B

- SOIL CAP
- GROUNDWATER/LEACHATE COLLECTION TRENCH AND TREATMENT
  - PRETREATMENT
  - COMPLETE TREATMENT
- UPGRADIENT SLURRY WALL
- PASSIVE GAS VENTILATION

- DEWATER, EXCAVATE, AND FILL LAGOONS
- SURFACE WATER CONTROLS
- SECURITY FENCE
- MONITORING

ALTERNATIVE #5C

- CLAY CAP
- PASSIVE GAS VENTILATION
- DEWATER, EXCAVATE, AND FILL LAGOONS
- SURFACE WATER CONTROLS
- SECURITY FENCE
- MONITORING

ALTERNATIVE #5D

- SOIL CAP
- GROUNDWATER/LEACHATE COLLECTION TRENCH AND TREATMENT
  - PRETREATMENT
  - COMPLETE TREATMENT
- PASSIVE GAS VENTILATION
- DEWATER, EXCAVATE, AND FILL LAGOONS
- SURFACE WATER CONTROLS
- SECURITY FENCE
- MONITORING

ALTERNATIVE #5E

- ALTERNATE WATER SUPPLY.

#AE
EVALUATION OF ALTERNATIVES

THE NATIONAL OIL AND HAZARDOUS SUBSTANCES CONTINGENCY PLAN (NCP) 40 CFR PART 300 SUBPART F DICTATES A DETAILED EVALUATION OF THE ALTERNATIVES.

THE DETAILED ANALYSIS EVALUATES EACH ALTERNATIVE ACCORDING TO ITS:

- PERFORMANCE (EFFECTIVENESS), RELIABILITY AND IMPLEMENTABILITY
- INSTITUTIONAL CONSTRAINTS/ISSUES
- ANY ADVERSE ENVIRONMENTAL OR HEALTH EFFECTS
- COST.

EACH ALTERNATIVE WAS EVALUATED AND COMPARED ON THE FACTORS LISTED ABOVE. THE EVALUATION IS SUMMARIZED BELOW:

ALTERNATIVE #1: THIS ALTERNATIVE WOULD NOT BE AT ALL EFFECTIVE IN PREVENTING OR MITIGATING THE RELEASE OF HAZARDOUS SUBSTANCES TO THE ENVIRONMENT. THE ADVERSE RISK TO PUBLIC HEALTH AND THE ENVIRONMENT WOULD CONTINUE AND THE VIOLATIONS OF EXISTING REGULATIONS, GUIDANCE, AND CRITERIA WOULD CONTINUE. THIS ALTERNATIVE IS EASILY IMPLEMENTABLE AND HAS THE LEAST ESTIMATED PRESENT WORTH COST OF $1,271,000.

ALTERNATIVE #2: THIS ALTERNATIVE HAS THE GREATEST PRESENT WORTH COST AT $137,309,000. IT REQUIRES EXCAVATION OF THE ENTIRE LANDFILL AND THE CONSTRUCTION OF A SECURE LANDFILL (RCRA) ADJACENT TO THE SITE. THE EXCAVATION OF THE LANDFILL HAS SEVERE POTENTIAL ADVERSE IMPACTS TO THE WORKERS ON SITE AND TO THE SURROUNDING RESIDENTS. THE UNKNOWN LOCATION AND NATURE OF THE MATERIAL BURIED IN THE LANDFILL WOULD REQUIRE EXTENSIVE SAFETY PRECAUTIONS. THESE PRECAUTIONS STILL MAY NOT PREVENT EXPLOSIONS OR RAPID RELEASES OF HAZARDOUS SUBSTANCES FROM CONTACT BY HEAVY EQUIPMENT WITH DRUMS OR OTHER CONTAINERS CONTAINING EXPLOSIVE, FLAMMABLE OR REACTIVE WASTE. EXPOSING MORE SOLID WASTES DURING EXCAVATION WOULD INCREASE THE UNCONTROLLED RELEASE OF

LANDFILL GASES AND WOULD BE EXPECTED TO INCREASE THE RISK TO RESIDENTS FROM AIR-BORNE CONTAMINANTS.

A MEANS TO REDUCE THE ADVERSE IMPACTS OF EXCAVATION WOULD BE TO LIMIT THE AREA OF EXCAVATION SO THAT ANY RELEASES CAN BE PROPERLY MANAGED. ALTHOUGH THIS IS IMPLEMENTABLE IT SUBSTANTIALLY INCREASES THE TIME TO IMPLEMENT THE REMEDIAL ACTION. THE TIME TO CONSTRUCT THE SECURE LANDFILL WOULD ALSO BE EXTENSIVE COMPARED TO THE OTHER ALTERNATIVES, CONSERVATIVELY ESTIMATED AT TWICE AS LONG AS THE OTHER ALTERNATIVES. THE INSTITUTIONAL CONSTRAINTS OF BUILDING A RCRA DISPOSAL FACILITY IN A RESIDENTIAL AREA WOULD BE SUBSTANTIAL AND COULD ADD ADDITIONAL TIME FOR IMPLEMENTATION. WHEN FULLY IMPLEMENTED THIS ALTERNATIVE WOULD PROVIDE THE MOST EFFECTIVE REMEDY.

ALTERNATIVE #3: THIS ALTERNATIVE INVOLVES A CLAY CAP; GROUNDWATER/LEACHATE COLLECTION AND TREATMENT; PASSIVE GAS VENTILATION; ALONG WITH LAGOON REMEDIATION; SURFACE WATER CONTROLS; SECURITY FENCE AND MONITORING.

THIS ALTERNATIVE WOULD REDUCE THE AMOUNT OF LEACHATE EMANATING FROM THE SITE BY 60%, FROM 124 GPM TO APPROXIMATELY 50 GPM ANNUALIZED FLOW. THE GROUNDWATER/LEACHATE COLLECTION TRENCH SUBSTANTIALLY REDUCES THE DISCHARGE OF THE LEACHATE TO EDWARDS RUN TO A NEGLIGIBLE AMOUNT AND ALMOST ELIMINATES THE RISK ASSOCIATED WITH INGESTION AND DERMAL CONTACT WITH EDWARDS RUN. THESE TWO COMPONENTS ALSO SUBSTANTIALLY REDUCE THE DIRECT CONTACT AND VAPOR INHALATION HAZARDS POSED BY THE EXPOSED WASTE AND LEACHATE ON THE SITE. THE CLAY CAP AND PASSIVE GAS VENTILATION SYSTEM WOULD EFFECTIVELY CONTROL THE RELEASE OF LANDFILL GASES, BUT THE ELEVATED RISKS TO NEARBY RESIDENTS ASSOCIATED WITH AIRBORNE RELEASE OF THESE GASES FROM THE VENTS WOULD NOT BE MITIGATED. THE SUBSURFACE MIGRATION OF GASES OFF-SITE WOULD BE EXPECTED TO BE ELIMINATED.

WITH THE INSTALLATION OF THE CLAY CAP, THE PIEZOMETRIC HEAD IN THE MOUNT LAUREL WOULD BE LOWER IN RESPONSE TO THE LACK OF RECHARGE THROUGH THE SITE AREA. THE WATER TABLE WOULD LOWER AND IS ESTIMATED TO REACH AN EQUILIBRIUM ABOUT 8.5 FEET LOWER THAN ITS PRESENT STAGE. THIS WOULD RESULT IN A REDUCTION IN THE POTENTIAL FOR CONTAMINATION OF THE ENGLISHTOWN AQUIFER DUE TO THE DECREASE IN THE VERTICAL HYDRAULIC GRADIENT. THE CLAY CAP'S EFFECT ON THE VERTICAL GRADIENT WOULD NOT BE SUFFICIENT TO REVERSE THE DOWNWARD FLOW. THE VERTICAL FLOW GRADIENT CURRENTLY REVERSES AT A POINT ALONG THE EASTERN EDGE OF THE SITE (FIGURE 1, POINT A). AT THIS POINT, THE PIEZOMETRIC SURFACE OF THE WATER TABLE EQUALS THE PIEZOMETRIC SURFACE OF THE ENGLISHTOWN. THIS POINT IS WHERE THE NET VERTICAL FLOW CHANGES FROM DOWN THROUGH THE MARSHALLTOWN AND INTO THE ENGLISHTOWN TO UP INTO THE MARSHALLTOWN. THE CLAY CAP WOULD ONLY SHIFT THE POINT ABOUT 200 FEET WEST, (POINT B) AND THUS WOULD ONLY SLIGHTLY REDUCE THE POTENTIAL FOR CONTAMINATION OF THE ENGLISHTOWN.

THE SURFACE WATER CONTROLS ARE NECESSARY FOR ALL THE ALTERNATIVES THAT HAVE A CAP (ALTERNATIVES 3,4,5A THROUGH D). RELOCATING EDWARDS RUN IS NECESSARY IN ORDER TO HAVE SPACE TO CONSTRUCT THE CAP AND TRENCH. THE OTHER SURFACE WATER CONTROLS REDUCE EROSION AND INFILTRATION WHICH SUBSEQUENTLY IMPROVES THE RELIABILITY AND EFFECTIVENESS AS WELL AS LOWERING THE MAINTENANCE COSTS OF THE CAP.

THE SECURITY FENCE, APPLICABLE TO ALL ALTERNATIVES (EXCEPT 5E), CONTROLS ACCESS AND REDUCES THE POTENTIAL FOR VANDALISM AND TRESPASSING. THIS HELPS TO KEEP MAINTENANCE COSTS DOWN AND REDUCES THE RISK OF EXPOSURE TO THE GASES CONCENTRATED FROM THE PASSIVE GAS VENT SYSTEM.

MONITORING IS NECESSARY FOR ALL THE ALTERNATIVES (EXCEPT 5E) IN ORDER TO DETERMINE THE EFFECTIVENESS OF THE REMEDIAL ACTION AND TO HELP DETERMINE THE LONG TERM RELIABILITY. MONITORING WOULD ALSO BE AN INSTITUTIONAL REQUIREMENT UNDER FEDERAL AND STATE REGULATIONS.

DEWATERING, EXCAVATING, AND FILLING THE LAGOONS (LAGOON REMEDIATION) IS COMMON TO ALTERNATIVES 3,4,5A THROUGH D. DEWATERING THE LEACHATE COLLECTION PONDS IS A PREREQUISITE TO FILLING THEM IN ORDER TO ATTAIN THE SLOPES FOR THE CAP. PRIMARILY BECAUSE THE NORTH LAGOON IS NOT OVER AND WASTE AND FOR EASE OF CONSTRUCTION OF THE CAP AND COLLECTION TRENCH, THE CAP AND TRENCH ARE NOT ENVISIONED TO EXTEND OVER THE NORTH LAGOON. HOWEVER, BECAUSE OF THE HIGH CONCENTRATION OF CONTAMINANTS AND THE VOLUME OF MATERIAL, THE NORTH LAGOON IS CONSIDERED TO PRESENT RISKS SIMILAR TO THAT POSED BY THE LEACHATE AND EDWARDS RUN. REMEDIATION OF THE NORTH LAGOON IS CONSIDERED ESSENTIAL TO ACHIEVE THE OVERALL EFFECTIVENESS OF A SOURCE CONTAINMENT REMEDIAL ACTION.

THE POTENTIAL ADVERSE IMPACTS ASSOCIATED WITH THE IMPLEMENTATION OF ALTERNATIVE 3 PRIMARILY DEAL WITH WORKER EXPOSURE DURING EXCAVATION OF THE COLLECTION TRENCH. PROPER SAFETY PRECAUTIONS SHOULD ELIMINATE THESE IMPACTS. ANOTHER SAFETY FACTOR TO BE CONSIDERED IS THE POTENTIAL FOR IGNITING THE METHANE BEING RELEASED

THROUGH THE CRACKS IN THE LANDFILL. HEAVY EQUIPMENT NEEDED FOR THE INSTALLATION OF THE CAP, HAS THE POTENTIAL TO BE AN IGNITION SOURCE FOR THE METHANE. THIS POTENTIAL HAZARD EXISTS ON THE SITE CURRENTLY FROM TRESPASSING VEHICLES AND APPEARS TO BE A RISK THAT IS INHERENT TO CAPPING ANY LANDFILL. SAFETY PRECAUTIONS SUCH AS SPARK ARRESTERS AND ACTIVE GAS COLLECTION DURING CONSTRUCTION, CAN REDUCE, BUT NOT ELIMINATE THIS POTENTIAL.

THE INSTITUTIONAL CONSTRAINTS THAT MAY AFFECT ALTERNATIVE 3 INCLUDE; STATE PERMIT REQUIREMENTS FOR THE TREATMENT PLANT DISCHARGES, BOTH AIR AND WATER, AND STREAM ENCROACHMENT; UTILIZATION OF ADJACENT PROPERTIES THAT ARE NOT PART OF THE SITE, PRIMARILY FOR INSTALLATION OF THE SURFACE WATER CONTROLS AND THE SECURITY FENCE; NOT ADHERING TO STATE REGULATION/GUIDANCE FOR OFF-SITE METHANE MIGRATION; ANY LOCAL ORDINANCES FOR CONSTRUCTION PROJECTS.

AS PREVIOUSLY DISCUSSED, WHEN OFF-SITE MIGRATION OF METHANE IS FOUND ABOVE 25% OF THE LEL, AN ACTIVE GAS COLLECTION SYSTEM MAY BE REQUIRED UNDER THE STATE REGULATIONS. THE NJDEP METHANE MIGRATION STUDY OF 1981 INDICATED OFF-SITE CONCENTRATIONS GREATER THAN 100% LEL. THE METHANE MIGRATION STUDY IN THE REMEDIAL INVESTIGATION FOUND LEVELS APPROACHING BUT NOT EXCEEDING 25% LEL. THE EARLIER STUDY MIGHT BE USED IN THE STATE'S DETERMINATION ON THE APPLICABILITY OF THE REGULATION. THIS ALTERNATIVE WOULD NOT SATISFY THAT REQUIREMENT, IF IMPOSED. IT IS ALSO ANTICIPATED THAT THE PASSIVE GAS VENTING SYSTEM WOULD HAVE TO CONFORM TO STATE AIR POLLUTION DISCHARGE CRITERIA.

THE EXTENT OF GROUNDWATER TREATMENT IS INDEPENDENT OF THE OTHER COMPONENTS OF THIS ALTERNATIVE. THE DETERMINATION OF WHICH TREATMENT SYSTEM WOULD BE NEEDED IS DEPENDENT ON THE RESULTS OF THE TREATABILITY STUDY AND SUBSEQUENT APPROVAL BY THE STATE AND LOCAL AUTHORITIES.

FOR THIS ALTERNATIVE THE DESIGN FLOW, WHICH IS ESTIMATED BASED ON A 1.3 FACTOR OF SAFETY MULTIPLICATION OF THE MAXIMUM ESTIMATED ANNUALIZED FLOW (150 GPM), IS 200 GPM INITIALLY, AND 125 GPM AFTER IMPLEMENTATION. THE 125 GPM IS EXPECTED TO CONTINUE FOR THE 30 YEAR DESIGN LIFE OF THE ALTERNATIVE. THE DESIGN FLOWS WERE ROUNDED UP TO THE NEAREST 25 GPM FOR COSTING PURPOSES.

THE ESTIMATED PRESENT WORTH COSTS FOR THIS ALTERNATIVE ARE $35,975,000 FOR COMPLETE TREATMENT AND $35,875,000 FOR PRETREATMENT.

ALTERNATIVE #4: THIS ALTERNATIVE INCLUDES A CLAY CAP; GROUNDWATER/LEACHATE COLLECTION AND TREATMENT; ACTIVE GAS VENTILATION AND TREATMENT; AN UPGRADIENT SLURRY WALL; DEWATER, EXCAVATE AND FILL LAGOONS; SURFACE WATER CONTROLS; SECURITY FENCE; AND MONITORING.

ALTERNATIVE 4 DIFFERS FROM ALTERNATIVES 3 IN THAT IT INCLUDES AN UPGRADIENT SLURRY WALL AND AN ACTIVE GAS VENTILATION AND TREATMENT SYSTEM. THESE COMPONENTS IMPROVE THE OVERALL EFFECTIVENESS OF THE ACTION BY SUBSTANTIALLY REDUCING THE AMOUNT OF LEACHATE GENERATED AND THE RELEASE OF LANDFILL GASES TO THE AMBIENT AIR. ANOTHER DIFFERENCE IS THE CLAY CAP IS EXTENDED FROM THE REFUSE LIMITS TO THE SLURRY WALL IN ORDER TO MAKE AN EFFECTIVE CONTAINMENT SYSTEM.

THE UPGRADIENT SLURRY WALL WOULD ACCOMPLISH TWO BENEFITS. ONE IS THAT IT REDUCES THE GROUNDWATER FLOW THROUGH THE MOUNT LAUREL FROM 55 GPM TO 4 GPM. THIS REDUCTION IN FLOW ALONG WITH THE REDUCTION IN PERCOLATION FROM THE CLAY CAP WOULD REDUCE THE FLOW INTO THE COLLECTION TRENCH FROM 124 GPM (179,000 GPD) TO ABOUT 15 GPM (21,500 GPD). THIS REPRESENTS AN 88% REDUCTION IN THE LEACHATE REQUIRING TREATMENT. THE OTHER BENEFIT TO THE SLURRY WALL, IN COMBINATION WITH THE CLAY CAP, IS THAT BY LOWERING THE WATER TABLE UNDER THE SITE THE VERTICAL HYDRAULIC GRADIENT WOULD REVERSE FROM DOWN TO THE ENGLISHTOWN TO UP TO THE MOUNT LAUREL (SEE FIGURE 2). OTHER FACTORS, ASIDE FROM FLOW DIRECTION SUCH AS DIFFUSION, EFFECT CONTAMINANT MIGRATION. HOWEVER, THE FLOW DIRECTION IS THE PREDOMINANT FACTOR IN CONTAMINANT MIGRATION. REVERSING THE FLOW WOULD NOT ABSOLUTELY ELIMINATE THE POTENTIAL FOR CONTAMINATION OF THE ENGLISHTOWN, BUT IT DOES PROVIDE THE MAXIMUM REDUCTION OF THE POTENTIAL FOR CONTAMINATION, EXCEPT FOR COMPLETE EXCAVATION.

THE ACTIVE GAS VENTILATION AND TREATMENT SYSTEM IS MORE EFFECTIVE IN CONTROLLING THE GAS AND REDUCING THE HAZARDS IT POSES THAN THE PASSIVE SYSTEM. THE TREATMENT OF THE GASES WOULD SUBSTANTIALLY REDUCES THE RISK TO THE RESIDENTS FROM AIR BORNE CONTAMINANTS OVER THE PASSIVE SYSTEM.

NO ADVERSE EFFECTS ARE ANTICIPATED DURING CONSTRUCTION OF THE SLURRY WALL OR THE ACTIVE GAS VENTILATION AND TREATMENT SYSTEM. PROPER SAFETY PRECAUTIONS WOULD BE NEEDED IF A SHORT TERM ACTIVE GAS SYSTEM IS UTILIZED DURING CONSTRUCTION OF THE CAP. ADVERSE EFFECTS FROM THE OTHER COMPONENTS ARE THE SAME AS ALTERNATIVE 3.

THE INSTITUTIONAL CONSTRAINTS ARE SIMILAR, EXCEPT FOR THE GAS VENTING SYSTEM, TO ALTERNATIVE 3, AND ARE NOT EXPECTED TO IMPEDE IMPLEMENTATION OF THIS ALTERNATIVE. THE STATE REQUIREMENT FOR ACTIVE GAS COLLECTION WOULD BE SATISFIED UNDER THIS ALTERNATIVE.

THE FLOW ESTIMATES USED FOR COSTING PURPOSES FOR THIS ALTERNATIVE WERE ESTIMATED TO DECREASE EXPONENTIALLY WITH TIME. THE INITIAL DESIGN FLOW IS ESTIMATED TO BE 200 GPM, THEN DECREASING TO 90 GPM THE FIRST YEAR AFTER IMPLEMENTATION AND THEN TO 15 GPM AT 10 YEARS. THE MINIMUM FLOW OF 15 GPM WOULD THEN BE EXPECTED TO CONTINUE FOR THE LIFE OF THE ALTERNATIVE. WITH THE FLOW SUBSTANTIALLY REDUCED, IT MAY BE POSSIBLE TO DISCONTINUE THE TREATMENT SYSTEM, SAVING SIGNIFICANT O&M COSTS.

THE DISCUSSION IN ALTERNATIVE 3 ON OTHER COMPONENTS (SURFACE WATER CONTROLS; DEWATER, EXCAVATE, AND FILL LAGOONS; SECURITY FENCE; AND MONITORING), WOULD APPLY TO ALTERNATIVE 4. THE PRESENT WORTH COST ESTIMATES FOR THIS ALTERNATIVE ARE $41,647,000 FOR COMPLETE TREATMENT AND $40,398,000 FOR PRETREATMENT.

ALTERNATIVE #5A: THIS ALTERNATIVE INCLUDES A CLAY CAP; PASSIVE GAS VENTILATION; AN UPGRADIENT SLURRY WALL; DEWATER, EXCAVATE, AND FILL LAGOONS; SURFACE WATER CONTROLS; SECURITY FENCE; AND MONITORING.

THIS ALTERNATIVE DOES NOT CONTAIN A GROUNDWATER/LEACHATE COLLECTION OR TREATMENT SYSTEM. THIS ALTERNATIVE WOULD MITIGATE THE RELEASE OF HAZARDOUS SUBSTANCES TO THE ENVIRONMENT BY REDUCING THE QUANTITY OF LEACHATE GENERATED. AS PREVIOUSLY DISCUSSED IN ALTERNATIVE 4, THE LEACHATE FLOW WOULD DECREASE FROM THE INITIAL ANNUALIZED FLOW OF 124 GPM TO 15 GPM OVER A TEN YEAR PERIOD.

THIS ALTERNATIVE WOULD ALLOW THE CONTINUED UNCONTROLLED DISCHARGE OF LEACHATE TO EDWARDS RUN AT A LOWER RATE THAN THE CURRENT DISCHARGE. IN AN EFFORT TO ATTEMPT TO QUANTIFY THE HEALTH AND ENVIRONMENTAL IMPACTS FROM THE CONTINUED DISCHARGE OF LEACHATE TO EDWARDS RUN, IT WAS ASSUMED THAT THE HEALTH RISKS DECREASE PROPORTIONALLY WITH THE FLOW. THIS WOULD RESULT IN THE POTENTIAL INCREASED CANCER RISK FOR INGESTION OF EDWARDS RUN WATER TO DROP TO 2.8 X 10-4 WITHIN TEN YEARS AFTER INSTALLATION OF THE ACTION. THIS RISK IS STILL CONSIDERABLY HIGHER THAN THE GENERALLY ACCEPTED 1 X 10-6 RISK.

THE ABOVE ASSUMPTION IS NOT AS EASILY APPLIED TO THE ENVIRONMENTAL EFFECTS. MANY OF THE PRELIMINARY DISCHARGE CRITERIA PARAMETERS ARE NOT FLOW DEPENDENT AND THE CONCENTRATION OF CONTAMINANTS IN THE LEACHATE MAY NOT BE FLOW DEPENDENT.

THE MECHANISMS FOR FORMATION OF LEACHATE WOULD CHANGE AFTER IMPLEMENTATION OF THIS ALTERNATIVE. AN INCREASINGLY SIGNIFICANT PORTION OF THE LEACHATE WOULD BE PREDOMINANTLY CLEAN ENGLISHTOWN WATER DISCHARGING INTO THE MOUNT LAUREL DUE TO A VERTICAL GRADIENT REVERSAL CREATED BY THE SLURRY WALL. THIS WOULD TEND TO DILUTE THE CONTAMINANTS. CONVERSELY, THE LACK OF A SIGNIFICANT AMOUNT OF CLEAN WATER ENTERING THE SITE IN THE MOUNT LAUREL FROM THE WEST, THAT COULD BE DILUTING THE LEACHATE NOW, WOULD NOT BE PRESENT AFTER CONSTRUCTION OF THE SLURRY WALL AND THEREFORE, THAT DILUTION WOULD NO LONGER BE AVAILABLE. THE CONCENTRATIONS COULD THEN BE EXPECTED TO INCREASE. ALSO THE AMOUNT OF PERCOLATION THROUGH THE FILL CURRENTLY COULD BE DILUTING PURE CONTAMINANTS OR IT COULD BE THE MECHANISM THAT "FLUSHES" THE WASTE, RELEASING CONTAMINANTS. AFTER IMPLEMENTATION OF THE ALTERNATIVE, HIGHER CONCENTRATIONS OF CONTAMINANTS MAY FLOW UNDILUTED INTO EDWARDS RUN OR MAY NOT BE RELEASED AT ALL FROM THE WASTE, ALTHOUGH THE FLOW IS EXPECTED TO DECREASE SIGNIFICANTLY.

DUE TO THE CURRENTLY UNKNOWN DEGREE OF VARIABILITY OF THE CONTAMINANT CONCENTRATIONS IN THE LEACHATE, A REASONABLE QUANTIFICATION OF THE ENVIRONMENTAL EFFECTS OF ALTERNATIVE 5A CANNOT BE MADE AND THE ASSUMPTION FOR THE HEALTH RISK DECREASE MAY NOT BE VALID. A REASONABLE SUBJECTIVE ESTIMATION WOULD BE THAT THE CONTAMINANT CONCENTRATION WOULD NOT MEET THE NON-FLOW DEPENDENT CRITERIA. THE ENVIRONMENTAL EFFECT ON THE STREAM AND THE POTENTIAL HEALTH THREAT AFTER THE MINIMUM FLOW OF 15 GPM IS ACHIEVED (10 YEARS) COULD BE NEGLIGIBLE IF THE LEACHATE DISCHARGED UNIFORMLY OVER THE +/- 3000 FT. CONTACT WITH EDWARDS RUN AND DID NOT CHANNEL ITSELF TO DISCRETE DISCHARGE POINTS.

THE DISCUSSIONS OF THE OTHER COMPONENTS TO THIS ALTERNATIVE ARE THE SAME AS THOSE DISCUSSED IN ALTERNATIVE 3.

THE ESTIMATED PRESENT WORTH COST FOR ALTERNATIVE 5A IS $36,347,000.

ALTERNATIVE #5B: THIS ALTERNATIVE INCLUDES; A GROUNDWATER COLLECTION AND TREATMENT SYSTEM; SOIL CAP; UPGRADIENT SLURRY WALL; PASSIVE GAS VENTILATION; DEWATER, EXCAVATE, AND FILL LAGOONS; SURFACE WATER CONTROLS; SECURITY FENCE; AND MONITORING.

THIS ALTERNATIVE DIFFERS FROM ALTERNATIVE 4 IN THAT IT UTILIZES A SOIL CAP AND PASSIVE GAS VENTILATION. THIS ALTERNATIVE HAS THE LOWER COST SOIL CAP TO REDUCE, BUT NOT ELIMINATE, PERCOLATION THROUGH THE REFUSE. LEACHATE FLOW TO THE COLLECTION AND TREATMENT SYSTEM WOULD BE EXPECTED TO BE REDUCED BY 60% FROM 124 GPM TO 50 GPM (ANNUALIZED FLOW). BY CONTINUING TO ALLOW SOME PERCOLATION THROUGH THE FILL, IT IS FELT THAT THIS MAY ENHANCE THE STABILIZATION OF THE WASTE AND "FLUSH" THE CONTAMINANTS FROM THE REFUSE INTO THE COLLECTION AND THE TREATMENT SYSTEM, YET STILL REMOVING THE DIRECT CONTACT HAZARD.

WITH THE INSTALLATION OF THE SLURRY WALL, THE ONLY SIGNIFICANT SOURCE OF WATER FOR LEACHATE GENERATION WOULD BE RAINFALL. THE IRREGULARITY OF RAINFALL MAY PRESENT SOME OPERATIONAL PROBLEMS WITH THE TREATMENT SYSTEM. LARGE PEAK FLOWS WOULD BE ENCOUNTERED AFTER HEAVY RAINS. GROUNDWATER LEVELS IN THE EASTERN SIDE OF THE LANDFILL ROSE SIGNIFICANTLY DURING AND SHORTLY AFTER A RAIN STORM OF ONE INCH. WITHIN TWO DAYS AFTER THE STORM, THE WATER LEVEL RETURNED TO APPROXIMATELY ITS ORIGINAL LEVEL. THIS INDICATES THAT THE LANDFILL IS SATURATED AND ANY AMOUNT OF RAIN THAT PERCOLATES INTO THE FILL CAUSES A SIMILAR AMOUNT OF LEACHATE TO BE DISCHARGED FROM THE FILL. BASED ON THIS OBSERVATION, THE PEAK DAILY FLOW IN THE TREATMENT SYSTEM COULD BE 116 GPM. CONVERSELY, DURING WINTER MONTHS WHEN PERCOLATION IS ESSENTIALLY ZERO, THE FLOW IN THE SYSTEM WOULD ONLY BE 15 GPM FROM LEAKAGE THROUGH THE SLURRY WALL AND UP FROM THE ENGLISHTOWN. THE FLOW RANGE FOR THE TREATMENT SYSTEM COULD RANGE BETWEEN 15 GPM TO 116 GPM. A TREATMENT SYSTEM COULD BE DESIGNED TO HANDLE THIS RANGE, POSSIBLY USING STABILIZATION TANKS, RECYCLE LOOPS, AND TREATMENT TECHNOLOGIES THAT DO NOT REQUIRE A MINIMUM FLOW IN ORDER TO OPERATE EFFECTIVELY. IT IS TECHNICALLY FEASIBLE TO EFFECTIVELY TREAT THIS WIDE FLOW RANGE, BUT IT WOULD BE MORE OPERATION INTENSIVE THAN CONSTANT FLOW TREATMENT SYSTEMS AND THEREFORE THE RELIABILITY IS LESS THAN THE OTHER CLAY CAP ALTERNATIVES.

ALSO BECAUSE OF THE SPORADIC NATURE OF THE RAINFALL THE PIEZOMETRIC HEAD UNDER THE FILL CANNOT BE CALCULATED. THEREFORE THE VERTICAL HYDRAULIC GRADIENTS BETWEEN THE MOUNT LAUREL AND THE ENGLISHTOWN CANNOT BE CALCULATED. THE EFFECT OF THIS ALTERNATIVE ON THE POTENTIAL FOR CONTAMINATION OF THE ENGLISHTOWN IS EXPECTED TO BE REDUCED OVER ALTERNATIVE 3 BUT WOULD BE A GREATER POTENTIAL THAN ALTERNATIVES 4 OR 5A.

THE DISCUSSION IN ALTERNATIVE 3 FOR THE PASSIVE GAS VENTILATION SYSTEM WOULD BE THE SAME AS THIS ALTERNATIVE. THE ADVERSE EFFECTS DURING CONSTRUCTION AND THE INSTITUTIONAL CONSTRAINTS WOULD ALSO BE THE SAME.

THE ESTIMATED PRESENT WORTH COSTS FOR ALTERNATIVE 5B ARE $35,324,000 FOR COMPLETE TREATMENT AND $34,317,000 FOR PRETREATMENT.

ALTERNATIVE #5C: THIS ALTERNATIVE INCLUDES; CLAY CAP; PASSIVE GAS VENTILATION SYSTEM; DEWATER, EXCAVATE, AND FILL LAGOONS; SECURITY FENCE AND MONITORING.

THIS ALTERNATIVE IS THE SAME AS ALTERNATIVE 5A EXCEPT THAT IT DOES NOT INCLUDE AN UPGRADIENT SLURRY WALL. NOT INSTALLING AN UPGRADIENT SLURRY WALL RESULTS IN A SIMILAR POTENTIAL RISK TO THE ENGLISHTOWN AS DISCUSSED IN ALTERNATIVE 3. THE LACK OF A GROUNDWATER COLLECTION AND TREATMENT SYSTEM WOULD PRESENT GREATER RISKS AND INSTITUTIONAL CONSTRAINTS DISCUSSED IN ALTERNATIVE 5A WITH RESPECT TO THE LEACHATE DISCHARGE TO EDWARDS RUN. THE PASSIVE GAS VENTILATION SYSTEM, LAGOON REMEDIATION, SECURITY FENCE AND MONITORING WOULD HAVE THE SAME RISKS, BENEFITS, AND INSTITUTIONAL CONSTRAINTS DISCUSSED IN ALTERNATIVE 3.

THE BENEFIT TO THIS ALTERNATIVE OVER ALTERNATIVES 3 AND 5A IS A LOWER PRESENT WORTH COST OF $28,934,000.

ALTERNATIVE #5D: THIS ALTERNATIVE INCLUDES; A SOIL CAP; GROUNDWATER/LEACHATE COLLECTION AND TREATMENT SYSTEM; PASSIVE GAS VENTILATION SYSTEM; DEWATER, EXCAVATE, AND FILL LAGOONS; SECURITY FENCE AND MONITORING.

THIS ALTERNATIVE IS THE SAME AS ALTERNATIVE 5B EXCEPT THAT IT DOES NOT CONTAIN AN UPGRADIENT SLURRY WALL. THIS RESULTS IN A POTENTIAL RISK FOR CONTAMINATION OF THE ENGLISHTOWN GREATER THAN ALL ALTERNATIVES EXCEPT THE #1 (NO ACTION) AND 5E. THE FLOW IN THE LEACHATE TREATMENT SYSTEM WOULD BE SPORADIC, AS DISCUSSED IN

ALTERNATIVE 5B, BUT WOULD RANGE FROM 50 GPM TO 176 GPM WITH AN ANNUALIZED FLOW OF 85 GPM. THIS RANGE WOULD BE EXPECTED TO PRESENT THE SAME TECHNICAL AND OPERATIONS PROBLEMS DISCUSSED FOR ALTERNATIVE 5B.

THE RISKS, BENEFITS, AND CONSTRAINTS ASSOCIATED WITH THE PASSIVE GAS VENTILATION SYSTEM, LAGOON REMEDIATION, SECURITY FENCE, AND MONITORING WOULD BE THE SAME AS THOSE DISCUSSED IN ALTERNATIVE 3.

THE ESTIMATED PRESENT WORTH COSTS FOR ALTERNATIVE 5D ARE $30,195,000 FOR COMPLETE TREATMENT AND $30,476,000 FOR PRETREATMENT.

ALTERNATIVE #5E: THIS ALTERNATIVE IS ONLY A MANAGEMENT OF MIGRATION REMEDIAL ACTION. IT INVOLVES CONNECTING FOURTEEN HOMES WITH WELLS ALONG JESSUPS MILL AND BOODY MILL ROADS TO A MUNICIPAL WATER SUPPLY. THIS ACTION WOULD ELIMINATE THE POTENTIAL FOR PRIVATE WELL CONTAMINATION FROM THE SITE. IT WOULD NOT MITIGATE ANY OTHER RISKS AND HAZARDS ASSOCIATED WITH THE SITE.

COST EVALUATION

THE ALTERNATIVE EVALUATION ABOVE DISCUSSED THE EFFECTIVENESS OF THE REMEDIAL ALTERNATIVES. ANOTHER FACTOR IN SELECTING A REMEDIAL ACTION IS COST. TABLE 13-3 SHOWS THE ESTIMATED CAPITAL, ANNUAL OPERATION AND MAINTENANCE (O&M), AND PRESENT WORTH COST FOR EACH ALTERNATIVE. THE CAPITAL COSTS INCLUDE INDIRECT COSTS OF 15% FOR ENGINEERING AND DESIGN, 5% FOR ADMINISTRATIVE AND LEGAL COSTS, AND 25% CONTINGENCY. PRESENT WORTH COSTS WERE CALCULATED AT A 10% DISCOUNT RATE OVER A 30 YEAR PERIOD WITH ALL THE CAPITAL COSTS INCURRED AT YEAR ZERO.

ALTERNATIVES 1, 2, AND 5E CONTAIN, FOR THE MOST PART, UNIQUE REMEDIAL ALTERNATIVE COMPONENTS. HOWEVER, ALTERNATIVES 3,4,5A THROUGH D CONTAIN THE SAME BASIC COMPONENTS OF A CAP, LAGOON REMEDIATION, SECURITY FENCE, AND MONITORING, BUT VARY WITH RESPECT TO THE MATERIAL IN THE CAP, GROUNDWATER LEACHATE COLLECTION SYSTEM, AN UPGRADIENT SLURRY WALL, AND THE GAS COLLECTION SYSTEM. A DISCUSSION ON THE COSTS OF THESE COMPONENTS FOLLOWS IN ORDER TO WEIGH THE INDIVIDUAL COSTS OF THE COMPONENTS WITH THEIR EFFECTIVENESS WHICH WAS PREVIOUSLY DISCUSSED.

TO ESTIMATE THE COST OF THE "CLAY" CAP VERSUS THE SOIL (NO CLAY) CAP, ALTERNATIVES 5B AND 4 CAN BE COMPARED SINCE THE ONLY DIFFERENCE IS THE CAP MATERIAL. THE PRESENT WORTH COST OF ALTERNATIVE 5B (WITH COMPLETE TREATMENT) IS $35,323,700 AND THE PRESENT WORTH COST FOR ALTERNATIVE 4 (WITH COMPLETE TREATMENT) IS $41,647,000. THIS INDICATES THE CLAY ADDITION TO THE CAP INCREASES THE PRESENT WORTH COST BY $6,323,3000 OR 18%. THE CAPITALIZED O&M COSTS OF ALTERNATIVES 4 AND 5B ARE $3,558,000 AND $4,103,000. THIS INDICATES THAT ADDING CLAY TO THE CAP REDUCES THE CAPITALIZED O&M COSTS BY $545,000 OR 13%.

THE ADDITION OF THE SLURRY WALL IS APPROXIMATELY $3,928,000. THE ADDITION OF THE SLURRY WALL LOWERS THE CAPITALIZED O&M COSTS BY $2,338,000 OR 40% FROM $5,896,000 (NO WALL) TO $3,558,000 (WITH A WALL). IF AT SOME TIME PRIOR TO 30 YEARS THE LEACHATE NO LONGER REQUIRES TREATMENT, DUE TO THE LOW FLOW, THE TREATMENT SYSTEM WILL NO LONGER BE NEEDED AND THE O&M SAVINGS WOULD INCREASE.

THE COSTS ASSOCIATED WITH THE ADDITION OF THE GROUNDWATER/LEACHATE COLLECTION AND TREATMENT SYSTEM CAN BE ILLUSTRATED BY COMPARING ALTERNATIVES 3 AND 5C. THE ADDITION OF THE COLLECTION AND TREATMENT SYSTEM (DESIGNED FOR 288,000 GPD) INCREASES THE PRESENT WORTH COSTS BY $7,041,600 AND $6,940,900 FOR COMPLETE AND PRETREATMENT, RESPECTIVELY. AS SHOWN IN TABLE 13-3 THE ANNUAL O&M COST FOR THE TREATMENT SYSTEM ARE FLOW DEPENDENT AND THEREFORE VARY FOR EACH ALTERNATIVE. OF THE ALTERNATIVES THAT CONTAIN TREATMENT, THE O&M OF THE TREATMENT SYSTEM IS THE MOST SIGNIFICANT PORTION OF THE OVERALL O&M COSTS.

THE ACTIVE GAS COLLECTION AND TREATMENT SYSTEM REPRESENTS APPROXIMATELY $600,000 IN INCREASED PRESENT WORTH COSTS OVER THE PASSIVE GAS VENTILATION SYSTEM. THE PASSIVE GAS SYSTEM HAS A DIRECT CAPITAL COST OF $509,000 AND INSIGNIFICANT OR NO O&M. THE ACTIVE GAS SYSTEM HAS A DIRECT CAPITAL COST OF $897,000 AND ANNUAL O&M COSTS OF $2,700 PER YEAR AND $15,000 AT 10, 20, 30 YEARS FOR CARBON REPLACEMENT.

#CR
COMMUNITY RELATIONS

A PUBLIC MEETING WAS HELD ON APRIL 26, 1984 AT THE MANTUA TOWNSHIP MUNICIPAL BUILDING TO DISCUSS THE WORK TO

BE UNDERTAKEN BY EPA'S CONSULTANT FOR THE RI/FS. NOTICES OF THE MEETING WERE SENT TO ALL LOCAL OFFICIALS AND INTERESTED PARTIES AS OUTLINED IN THE HELEN KRAMER LANDFILL COMMUNITY RELATIONS PLAN. AT THIS MEETING, EPA OFFICIALS PROVIDED AN OVERVIEW OF THE SUPERFUND PROGRAM. THEY ALSO DISCUSSED THE RI/FS ACTIVITIES WHICH WERE GOING TO BE PERFORMED AS PART OF THE HELEN KRAMER PROJECT. FOLLOWING THIS PRESENTATION, THE MEETING WAS CONCLUDED WITH A QUESTION AND ANSWER SESSION.

AT THE REQUEST OF THE MAYOR A BRIEFING ON THE STATUS OF THE RI/FS WAS HELD ON APRIL 30, 1985 AT THE MANTUA TOWNSHIP MUNICIPAL BUILDING. THE MAYOR WAS INFORMED OF THE PRELIMINARY RESULTS OF THE REMEDIAL INVESTIGATION AND UPDATED ON THE SCHEDULE FOR COMPLETION OF THE FEASIBILITY STUDY.

A SECOND PUBLIC MEETING WAS HELD ON AUGUST 1, 1985 AT THE MANTUA TOWNSHIP MUNICIPAL BUILDING TO DISCUSS THE REMEDIAL ALTERNATIVES. AN INFORMATION PACKAGE INCLUDING AN AGENDA AND A FACT SHEET WERE PROVIDED TO THE APPROXIMATELY 20 PEOPLE WHO ATTENDED. COPIES OF THE DRAFT FEASIBILITY STUDY AND NOTIFICATION OF THE PUBLIC MEETING WERE SENT TO LOCAL OFFICIALS, OTHER INTERESTED PARTIES, AND DOCUMENT REPOSITORIES FOR PUBLIC REVIEW. EPA OFFICIALS AND THEIR CONSULTANT DISCUSSED THE REMEDIAL ALTERNATIVES AND RESPONDED TO THE CONCERNS AND QUESTIONS RAISED TO THE PUBLIC.

THE PUBLIC COMMENT PERIOD ON THE RI/FS BEGAN JULY 22, 1985 AND EXTENDED THROUGH AUGUST 12, 1985. A RESPONSIVENESS SUMMARY ADDRESSING THE CONCERNS AND COMMENTS RECEIVED AT THE AUGUST 1ST PUBLIC MEETING AND DURING THE COMMENT PERIOD IS ATTACHED TO THIS DOCUMENT.

#RA
RECOMMENDED ALTERNATIVE

ACCORDING TO THE CFR PART 300.68 (J), COST-EFFECTIVE IS DESCRIBED AS THE LOWEST COST ALTERNATIVE THAT IS TECHNICALLY FEASIBLE AND RELIABLE AND WHICH EFFECTIVELY MITIGATES AND MINIMIZES DAMAGES TO AND PROVIDES ADEQUATE PROTECTION OF PUBLIC HEALTH, WELFARE, AND THE ENVIRONMENT. A COST COMPARISON OF THE REMEDIAL ALTERNATIVES IS PRESENTED IN TABLE 13-3. THE EVALUATION OF THE REMEDIAL ALTERNATIVES LEADS TO THE CONCLUSION THAT ALTERNATIVE #4 IS THE APPROPRIATE COST-EFFECTIVE ALTERNATIVE (SEE FIGURE 12-13).

ALTERNATIVE #4 INCLUDES:

- GROUNDWATER/LEACHATE COLLECTION AND TREATMENT
- CLAY CAP
- UPGRADIENT SLURRY WALL
- ACTIVE GAS COLLECTION AND TREATMENT
- DEWATER, EXCAVATE, AND FILL LAGOONS
- SECURITY FENCE
- MONITORING.

THIS ALTERNATIVE EFFECTIVELY MITIGATES ALL THE CURRENT AND POTENTIAL ADVERSE PUBLIC HEALTH AND ENVIRONMENTAL IMPACTS CAUSED BY THE RELEASE OF HAZARDOUS SUBSTANCES AT THE SITE. THE GROUNDWATER/LEACHATE COLLECTION AND TREATMENT SYSTEM SUBSTANTIALLY REDUCES THE DISCHARGE OF HAZARDOUS SUBSTANCES TO EDWARDS RUN. THE CLAY CAP AND UPGRADIENT SLURRY WALL REDUCE THE POTENTIAL FOR CONTAMINATION OF THE ENGLISHTOWN AQUIFER, THE AMOUNT OF LEACHATE WHICH IS GENERATED AND THE AMOUNT TO BE TREATED TO THE EXTENT PRACTICABLE. THE ACTIVE GAS COLLECTION AND TREATMENT SYSTEM IS NEEDED TO FULLY MITIGATE THE POTENTIAL AIR CONTAMINATION AND RELIABLY CONTROL LANDFILL GASES.

ALTERNATIVE 1 (NO ACTION) AND 5E (EXTEND WATER LINES) DO NOT EFFECTIVELY MITIGATE THE ADVERSE IMPACTS CAUSED BY THE SITE. ALTERNATIVE #2, (NEW RCRA LANDFILL), IS CONSIDERED TO BE COST PROHIBITIVE AND PRESENTS A SUBSTANTIAL SAFETY HAZARD DURING IMPLEMENTATION. OF ALTERNATIVE 3,4,5A THROUGH D, ALTERNATIVE #4 IS THE ONLY ALTERNATIVE THAT EFFECTIVELY MITIGATES THE ADVERSE IMPACTS THROUGH ALL THE POTENTIAL PATHWAYS OF EXPOSURE.

ALTERNATIVE 4 CURRENTLY HAS TWO TREATMENT OPTIONS FOR THE GROUNDWATER/LEACHATE, COMPLETE TREATMENT ON SITE AND DISCHARGE TO EDWARDS RUN, AND ON-SITE PRETREATMENT AND DISCHARGE TO THE GLOUCESTER COUNTY UTILITIES AUTHORITY WASTEWATER TREATMENT PLANT. THE NEED FOR LEACHATE COLLECTION AND TREATMENT HAS BEEN ESTABLISHED, THE EXTENT OF THE ON-SITE TREATMENT IS INDEPENDENT OF THE EVALUATION OF THE ALTERNATIVES IN THIS RECORD OF

DECISION. THE EXTENT OF ON-SITE TREATMENT IS DEPENDENT ON THE TREATABILITY STUDY AND THE INSTITUTIONAL CONSTRAINTS ESTABLISHED BY THE STATE AND LOCAL AUTHORITIES. UPON COMPLETION OF THE TREATABILITY STUDY AND BASED ON THE TREATABILITY STUDY THE REGION WILL DETERMINE THE LEAST COST TREATMENT OPTION. THEN WORKING WITH THE STATE AND LOCAL AUTHORITIES THE REGION WILL EVALUATE THE TREATMENT OPTION WITH RESPECTS TO THE INSTITUTIONAL CONSTRAINTS. THE DECISION ON WHICH TREATMENT SYSTEM IS IMPLEMENTED WILL BE DETERMINED BY THE LEAST PRESENT WORTH COST TREATMENT OPTION THAT IS ENVIRONMENTALLY ACCEPTABLE AND IMPLEMENTABLE.

BECAUSE OF THE SUBSTANTIAL FLOW DECREASE WITH TIME FOR ALTERNATIVE 4, IT MAY BE POSSIBLE TO RENT A NUMBER OF PACKAGE TREATMENT PLANTS INSTEAD OF BUILDING A PLANT ON SITE. THIS SHOULD LOWER THE CAPITAL COST OF THE TREATMENT PLANT SIGNIFICANTLY.

#OEL
COMPLIANCE WITH OTHER ENVIRONMENTAL LAWS

THE RECOMMENDED ALTERNATIVE, #4, IS ENVISIONED TO BE IMPLEMENTED, CONSTRUCTED AND OPERATED IN FULL COMPLIANCE WITH ALL APPLICABLE EXISTING ENVIRONMENTAL STATUTES WITH THE EXCEPTIONS DISCUSSED BELOW.

- FLOODPLAINS AND WETLANDS

THE PRELIMINARY CONCEPTUAL PLANS FOR THE RECOMMENDED REMEDIAL ALTERNATIVE INDICATE THAT COMPONENTS OF THE ACTION ARE WITHIN A DESIGNATED 100 YEAR FLOODPLAIN. THE WORK IS AFFECTED BY EXECUTIVE ORDER (EO) 11988 - FLOODPLAIN MANAGEMENT, AND THE RECOMMENDED ALTERNATIVE WILL COMPLY WITH EO 11988. TO ENSURE COMPLIANCE WITH EO 11988, AN EVALUATION OF THE CONCEPTUAL PLANS WILL BE PERFORMED DURING THE DESIGN PHASE TO DETERMINE WHAT ACTIONS, IF ANY, ARE NEEDED TO PROTECT THE COMPONENTS FROM FLOODING AND IF THE COMPONENTS ADVERSELY AFFECT THE FLOODPLAIN. IF THE PLANS FOR THE ALTERNATIVE DO NOT COMPLY, THE DESIGN WILL BE MODIFIED IN ORDER TO COMPLY WITH EO 11988. AT THIS TIME, THERE APPEARS TO BE SUFFICIENT FLEXIBILITY IN THE CONCEPTUAL PLANS SO THAT COMPLIANCE WITH EO 11988 WOULD BE TECHNICALLY FEASIBLE AND WOULD NOT SIGNIFICANTLY AFFECT THE ENVIRONMENTAL BENEFITS OR ESTIMATED COST OF THE RECOMMENDED ALTERNATIVE.

THE IMPACTS OF THE SITE CURRENTLY, AND THE RECOMMENDED ALTERNATIVE ARE ALSO BELIEVED TO BE AFFECTED BY EXECUTIVE ORDER 11990 - PROTECTION OF WETLANDS. THE AREA ADJACENT TO THE SITE APPEARS TO CONFORM TO THE REGULATORY DEFINITION OF A WETLAND. IT APPEARS THAT APPROXIMATELY THREE ACRES OF WETLANDS ARE CURRENTLY ADVERSELY AFFECT BY THE SITE. SEVERELY STRESSED VEGETATION IS PRESENT IN THE WETLANDS NEAR THE SOUTH RAVINE.

THE RECOMMENDED REMEDIAL ACTION WOULD PREVENT ANY FURTHER CONTAMINATION OF THESE WETLANDS. THE AREA SHOULD RECOVER NATURALLY. THE CAP IS EXPECTED TO INTRUDE INTO THE WETLANDS AND COVER APPROXIMATELY ONE ACRE. THE DESIGN WILL ATTEMPT TO MINIMIZE THE ENCROACHMENT TO THE EXTENT FEASIBLE. THE OVERALL EFFECT OF THE REMEDIAL ACTION IS BENEFICIAL TO THE WETLANDS BY RESTORING TWO ACRES. ANOTHER SIX ACRES OF WETLANDS IS LOCATED SOUTH OF THE LANDFILL AND APPEARS TO ONLY BE IMPACTED IN A SMALL AREA WHERE THE SOUTHERN TIP OF THE LANDFILL MEETS THE EDGE OF THE WETLANDS. THE ONLY CONTAMINATION OBSERVED IN THIS AREA IS VISUAL IRON STAINING. THE RECOMMENDED ACTION WOULD BE EXPECTED TO ELIMINATE FURTHER CONTAMINATION WITHOUT ENCROACHING ON THE WETLANDS.

- RCRA SUBTITLE C, 40 CFR PART 264

THE CLAY CAP IN THE RECOMMENDED ALTERNATIVE IS BELIEVED TO BE IN COMPLIANCE WITH THE CRITERIA LISTED IN CFR 264.310 (A). HOWEVER, RCRA GUIDANCE DOCUMENTS FOR DESIGN OF A FINAL LANDFILL COVER INCLUDE A 20 MIL SYNTHETIC LINER PLACED ABOVE THE CLAY AND BELOW THE SAND DRAINAGE LAYER. AS PREVIOUSLY DISCUSSED, IT IS CONSIDERED TECHNICALLY IMPRACTICABLE TO INCLUDE A SYNTHETIC LINER IN THE CAP OF THE RECOMMENDED ALTERNATIVE. THE RCRA GUIDANCE RECOMMENDS A SLOPE OF 3-5% FOR FINAL COVER. IN ORDER TO CONFORM TO THE RECOMMENDED SLOPE AN ESTIMATED 3.77 MILLION CUBIC YARDS OF FILL WOULD BE NEEDED TO BRING THE EXISTING SLOPES UP TO 5%. THIS IS ALMOST TWICE THE ESTIMATED VOLUME OF THE WASTE AT THE SITE. THE COST AND TIME TO EXCAVATE, HAUL, AND RECOMPACT THE FILL WOULD BE PROHIBITIVE AND IMPRACTICABLE. FROM AN ENVIRONMENTAL PERSPECTIVE THE RCRA FINAL COVER WOULD ALMOST ELIMINATE THE WETLAND AREA ADJACENT TO THE SITE SINCE THE CAP WOULD HAVE TO BE EXTENDED OVER THIS AREA. THE RCRA CAP WOULD NECESSITATE RELOCATING EDWARDS RUN TO A NEW CHANNEL ON THE OTHER SIDE OF THE VALLEY OR INSTALLING A CULVERT UNDER THE CAP.

IN ACCORDANCE WITH CURRENT CERCLA/RCRA GUIDANCE, THE CLAY CAP IN THE RECOMMENDED ALTERNATIVE WAS EVALUATED

USING THE HELP MODEL DEVELOPED FOR EVALUATING FINAL COVER. THE MODEL ESTIMATES THE LEAKAGE THROUGH THE CLAY COVER WOULD BE 700 GPD. THIS REPRESENTS A 99.2% REDUCTION IN PERCOLATION THROUGH THE FILL. THE RCRA RECOMMENDED CAP COULD ACHIEVE A 100% REDUCTION IN PERCOLATION ASSUMING THE LINER REMAINS INTACT AND IS NOT AFFECTED BY DIFFERENTIAL SETTLING. THE INCREASED REDUCTION OF 0.8% IS NOT CONSIDERED TO BE A SIGNIFICANT IMPROVEMENT WHEN WEIGHED AGAINST THE ADVERSE TECHNICAL CONSIDERATIONS.

THE INSTALLATION OF A RCRA RECOMMENDED FINAL COVER AT THE HELEN KRAMER LANDFILL SITE IS CONSIDERED TECHNICALLY IMPRACTICABLE FOR THE REASONS DISCUSSED ABOVE. THE RCRA CAP WOULD SIGNIFICANTLY ADVERSELY AFFECT THE WETLANDS ADJACENT TO THE SITE AND THEREFORE MAY PRESENT FURTHER UNACCEPTABLE ENVIRONMENTAL IMPACTS.

OPERABLE UNITS

THERE ARE NO OPERABLE UNITS ANTICIPATED FOR THE RECOMMENDED ALTERNATIVE. IMPLEMENTATION OF THIS ALTERNATIVE IS EXPECTED TO BE THE FINAL REMEDY FOR THIS SITE.

IT IS POSSIBLE TO IMPLEMENT SOME OF THE REMEDIAL COMPONENTS INDEPENDENT OF EACH OTHER. FOR EXAMPLE, THE SLURRY WALL AND COLLECTION TRENCH CAN BE IMPLEMENTED INDEPENDENT OF EACH OTHER AND THEN BE FOLLOWED WITH CAP INSTALLATION. THE SEQUENCE OF CONSTRUCTION OF THE RECOMMENDED ALTERNATIVE COMPONENTS WILL BE EVALUATED DURING DESIGN. IF FEASIBLE, IT WOULD BE DESIRABLE TO PHASE THE CONSTRUCTION TO ALLOW FOR PHASING OF THE FUNDING.

A SIGNIFICANT COST SAVINGS MAY BE REALIZED BY UTILIZING SMALL "PACKAGE" TREATMENT UNITS INSTEAD OF BUILDING A PERMANENT TREATMENT PLANT TO HANDLE THE HIGH INITIAL FLOW. AS THE FLOW DECREASES WITH TIME THE MODULES OF THE PACKAGE UNITS CAN BE REMOVED. IT MAY ALSO BE POSSIBLE TO DISCONTINUE ON-SITE TREATMENT WHEN THE FLOW STABILIZES AND DISCHARGE DIRECTLY TO THE POTW. UTILIZATION OF MODULAR "PACKAGE" TREATMENT SYSTEMS WILL BE CONSIDERED DURING DESIGN.

AS A MEANS TO REDUCE THE IMPACTS OF DIFFERENTIAL SETTLING ON THE CAP MAINTENANCE, PHASING THE INSTALLATION OF THE CAP AND MONITORING OF THE SETTLING OF THE CAP SHOULD BE EVALUATED IN THE DESIGN PHASE.

#OM
OPERATION & MAINTENANCE

ALL THE REMEDIAL COMPONENTS OF THE RECOMMENDED ALTERNATIVE REQUIRE OPERATION AND/OR MAINTENANCE TO VARYING DEGREES, EXCEPT THE LAGOON REMEDIATION.

#FA
FUTURE ACTION

ADDITIONAL STUDIES

IT IS ANTICIPATED THAT ADDITIONAL INVESTIGATIONS AND/OR STUDIES MAY BE NECESSARY IN ORDER TO PROPERLY DESIGN THE SELECTED REMEDY. THESE MAY INCLUDE, BUT ARE NOT LIMITED TO; PILOT STUDIES FOR THE COMPONENTS OF THE ON-SITE TREATMENT SYSTEM, ADDITIONAL BORINGS FOR MORE DETAILED GEOLOGIC DATA, AND ADDITIONAL GAS TESTING FOR SIZING THE TREATMENT SYSTEM.

#SCH

SCHEDULE	DATE
- FINAL RECORD OF DECISION	SEPTEMBER 1985
- OBLIGATE DESIGN FUNDS	PENDING CERCLA REAUTHORIZATION
- AMEND STATE SUPERFUND CONTRACT	SEPTEMBER 1985
- CONTINUE RESPONSIBLE PARTY SEARCH	ONGOING

- INITIATE DESIGN	PENDING CERCLA REAUTHORIZATION
- COMPLETE DESIGN	PENDING FUNDING REAUTHORIZATION.

#TMA
TABLES, MEMORANDA, ATTACHMENTS

APPENDIX 1

MESSAGE FLAGS FOR CHEMISTRY DATA

( )	RESULT IS A VALUE GREATER THAN OR EQUAL TO THE INSTRUMENT DETECTION LIMIT BUT LESS THAN THE CONTRACT REQUIRED DETECTION LIMIT.
B	ANALYTIC IS FOUND IN THE BLANK AS WELL AS A SAMPLE. IT INDICATES POSSIBLE PROBABLE BLANK CONTAMINATION AND WARNS THE DATA USER TO TAKE APPROPRIATE ACTION.
S	VALUE DETERMINED BY METHOD OF STANDARD ADDITION.
J	INDICATES AN ESTIMATED VALUE. THIS FLAG IS USED EITHER WHEN ESTIMATING A CONCENTRATION FOR TENTATIVELY IDENTIFIED COMPOUNDS, WHERE A 1:1 RESPONSE IS ASSUMED OR WHEN THE MASS SPECTRAL DATA INDICATES THE PRESENCE OF A COMPOUND THAT MEETS THE IDENTIFICATION CRITERIA BUT THE RESULT IS LESS THAN THE INDICATED DETECTION LIMIT BUT GREATER THAN ZERO.
K	ACTUAL VALUE WITHIN THE LIMITATIONS OF THIS METHOD IS LESS THAN THE VALUE GIVEN.
B	BLANK GREATER THAN 1/2 METHOD DETECTION LIMIT AND GREATER THAN 1/2 CONCENTRATION IN SAMPLE.
R	INDICATES SPIKE SAMPLE RECOVERY IS NOT WITHIN CONTROL LIMITS.

MESSAGE FLAGS FOR CHEMISTRY DATA, CON'T

UNDETECTED:	NOT PRESENT IN SAMPLE ABOVE DETECTION LIMIT.
NOT REPORTED:	NO ANALYTICAL RESULTS AT TIME OF REPORT PREPARATION DUE TO: PARAMETERS NOT REQUIRED BY CLP CONTRACT, LOST SAMPLE OR ANALYTICAL RESULTS, DELAY OF DATA TRANSMITTAL.
PRELIMINARY:	DATA NOT QUALITY ASSURED AND SUBJECT TO CHANGE.
FINAL:	DATA QUALITY ASSURED.
REJECTED:	DATA REPORTED BUT RESULTS REJECTED DUE TO QUALITY ASSURANCE PROBLEMS SUCH AS BAD METHODS, POOR RECOVERY, HOLDING TIME VIOLATION, BAD SURROGATE, OR OTHER.

TABLE 6-1

NJDEP HAZARDOUS SITE MITIGATION ADMINISTRATION
AIR MONITORING PROGRAM AT HELEN KRAMER LANDFILL
OCTOBER 31, TO NOVEMBER 2, 1983*

COMPOUND	LEACHATE SEEP AREA PPB	SITE MEAN VALUE PPB
VINYLIDENE CHLORIDE	40.0	38.9
METHYLENE CHLORIDE	29.6	12.3
CHLOROPRENE	ND	ND
CHLOROFORM	1.96	0.82
1,2-DICHLOROETHANE	ND	0.36
1,1,1-TRICHLOROETHANE	6.48	2.61
BENZENE	16.2	7.51
CARBON TETRACHLORIDE	0.08	0.12
TRICHLOROETHYLENE	9.37	2.43
DIOXANE	ND	0.01
1,1,2-TRICHLOROETHANE	2.88	1.22
TOLUENE	137	46.5
1,2-DIBROMOETHANE	ND	0.47
TETRACHLOROETHYLENE	5.49	1.91
CHLOROBENZENE	1.06	0.80
ETHYLBENZENE	6.65	3.85
M,P-XYLENE	14.6	7.43
STYRENE	0.61	1.53
O-XYLENE	3.13	2.31
1,1,2,2-TETRACHLOROETHANE	0.02	0.78
O-CHLOROTOLUENE	0.44	0.50
P-CHLOROTOLUENE	0.63	0.36
P-DICHLOROBENZENE	0.42	0.54
O-DICHLOROBENZENE	0.63	0.86
NITROBENZENE	0.14	0.54
NAPHTHALENE	0.09	0.30

ND - NOT DETECTED (REPORTED BY NJDEP HSMA AS ZEROS)
(ALL VALUES ARE THREE-DAY MEAN CONCENTRATIONS)

* FROM GIANTI, ET. AL. 1984.

#RS

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
RESPONSIVENESS SUMMARY FOR THE
HELEN KRAMER LANDFILL SITE

MANTUA TOWNSHIP, NEW JERSEY

BASED ON COMMENTS FROM
PUBLIC MEETING OF
AUGUST 1, 1985

TOPIC: HEALTH CONCERNS

ISSUE: ARE ANY WELLS IN THE LANDFILL AREA USED FOR THE IRRIGATION OF CROPS?

RESPONSE: A FARMER LIVING WEST OF THE LANDFILL HAD A FIRE WELL THAT WAS INSTALLED TO PROVIDE WATER TO EXTINGUISH PREVIOUS FIRES. HE THEN TURNED THIS WELL INTO AN IRRIGATION WELL. WE TESTED THAT WELL VERY EARLY ON AND IT IS CLEAN. IT IS A DEEP WELL.

ISSUE: ARE YOU GOING TO BE TESTING OUR WELLS?

RESPONSE: NO, THERE WILL BE TESTING OF EPA MONITORING WELLS AS PART OF THE DESIGN AND MONITORING PROGRAM THAT WE WILL BE DEVELOPING. WE DO NOT LIKE TO USE RESIDENTIAL WELLS AS MONITORING WELLS. OUR WELLS WILL DETECT ANY CONTAMINATION BEFORE IT REACHES ANY PRIVATE WELLS.

ISSUE: YOU TOOK THESE AIR SAMPLES IN APRIL OR MAY WHEN THE WIND WAS BLOWING AT LEAST 30 MILES PER HOUR. I SAW YOU PEOPLE DOING THIS. AND WHEN YOU TOOK YOUR AIR SAMPLES, YOU SHOULDN'T HAVE EVEN BEEN THERE. THE WIND WAS BLOWING LIKE HELL. NOW IS WHEN YOU SHOULD BE TAKING AIR SAMPLES, ON AN EVENING LIKE TONIGHT.

RESPONSE: WE TOOK AIR SAMPLES -- ACTUALLY, THE STATE OF NEW JERSEY TOOK AIR SAMPLES -- IN SEPTEMBER. WE CONTINUALLY TOOK AIR SAMPLES AS PART OF OUR HEALTH AND SAFETY PROGRAM. EVERY DAY WE WERE OUT THERE, SOMEBODY WAS TAKING AIR SAMPLES.

ISSUE: I'M TELLING YOU RIGHT NOW THAT WHEN A GENTLE EAST WIND IS BLOWING, MY HOUSE IS NOT FIT TO LIVE IN. YOU CAN'T TELL ME THAT YOU'RE SURE THAT I'M NOT BEING POLLUTED FROM THAT AIR COMING OUT OF THAT DUMP.

RESPONSE: THERE IS NO IMMEDIATE THREAT FROM THE LANDFILL.

ISSUE: WHAT HAPPENS IF I DIE TWO YEARS FROM NOW? YOU'RE STILL GOING TO TELL ME THAT THERE IS NO IMMEDIATE THREAT, RIGHT?

RESPONSE: FROM THE DATA WE HAVE TO DATE, THERE IS NO IMMEDIATE THREAT.

ISSUE: YOU CANNOT TELL ME THIS FOR SURE.

RESPONSE: THE HYDROGEN SULFIDE AND THE MERCAPTANS THAT YOU SMELL -- AND THEY DO SMELL TERRIBLE -- ARE AT LEVELS FAR BELOW ANYTHING THAT IS CONSIDERED HARMFUL. NOW I'M NOT DISPUTING THE ODOR PROBLEM, AND I KNOW IT'S DOWNRIGHT PUTRID, BUT THOSE COMPOUNDS THAT CAUSE THAT ODOR ARE NOT HARMFUL.

ISSUE: I AM NOT TALKING ABOUT JUST THE METHANE. I'M TALKING ABOUT OTHER THINGS THAT WENT INTO THAT DUMP THAT I'VE SEEN.

RESPONSE: THE OTHER CHEMICALS THAT WE ARE FINDING HAVE BEEN DETECTED IN LOW PARTS PER BILLION ON SITE. MOST OF THE INDUSTRIAL STANDARDS FOR THOSE CHEMICALS ARE IN PARTS PER MILLION, GENERALLY THOUSANDS OF TIMES GREATER. AND THOSE LEVELS (THAT WE DETECTED) DISPERSE RAPIDLY AS YOU GET FARTHER AWAY FROM THE SITE. THERE IS STILL A RISK ASSOCIATED WITH THOSE CHEMICALS BEING EMITTED AND THAT RISK WAS EVALUATED IN THE STUDY.

AS PART OF THE REMEDIATION PLAN, THERE WILL BE GAS COLLECTION AND VENTING. THE GAS WILL BE DESTROYED.THE THRESHOLD LIMIT VALUES FOR THOSE PARAMETERS, AS WE STATED EARLIER, ARE A THOUSAND TIMES HIGHER THAN THE CONCENTRATIONS THAT WE MEASURED WHILE WE WERE RIGHT ON THE LANDFILL. AND THOSE THRESHOLD LIMIT VALUES ARE ESTABLISHED FOR A CONTINUOUS CONCENTRATION (THAT'S A THOUSAND TIMES HIGHER THAN WE MEASURED) FOR AN EIGHT HOUR PERIOD EVERYDAY THAT YOU'RE IN THE WORKING PLACE. AND WHAT IS HAPPENING ON THE LANDFILL IS THAT WE HAVE A MEASURED CONCENTRATION A THOUSAND TIMES LESS THAN THE THRESHOLD LIMIT VALUE WITH NO CONTINUOUS CONCENTRATION BECAUSE OF THE CHANGE IN WIND DIRECTION, VELOCITY, AND SO FORTH. THERE IS NO IMMEDIATE THREAT.

ISSUE: YOU'RE TELLING ME THAT THERE IS NO DANGER FROM THE AIR IN THE OUTER LANDFILL?

RESPONSE: OFF OF THE LANDFILL THERE IS AN INCREASED RISK FROM THE GASES COMING OUT OF THE LANDFILL.

TOPIC: TECHNICAL CONSIDERATIONS

ISSUE: HAS THERE BEEN ANY THOUGHT GIVEN CONCERNING THE FEASIBILITY OF RECOVERING THE METHANE?

RESPONSE: IT HAS BEEN CONSIDERED BUT WE DID NOT REALLY EVALUATE IT, PRIMARILY BECAUSE OUR INITIAL CONCERN IS TO GATHER IT AND DESTROY THE HAZARDOUS CHEMICALS. HOWEVER, WE WILL RECONSIDER THE POSSIBILITY OF RECOVERING THE GAS.

ISSUE: DO YOU HAVE ANY IDEA REGARDING THE POSSIBILITY OR DANGER OF ADDITIONAL SEEPAGE OF CONTAMINANTS INTO THE GROUNDWATER DURING THE 30 YEARS OF THIS PROJECT?

RESPONSE: WE FIRST HAVE TO ACTUALLY CHOOSE THE ALTERNATIVE. THERE IS THE POTENTIAL FOR CONTAMINANTS TO MIGRATE INTO THE GROUNDWATER WHICH FLOWS UNDERGROUND. HOWEVER, AN AQUITARD, WHICH WE TALKED ABOUT EARLIER, SLOWS EVERYTHING DOWN; IT TAKES A NUMBER OF YEARS FOR WATER TO GET THROUGH. WE ARE TALKING A NUMBER OF YEARS DOWN THE ROAD FOR THE POTENTIAL FOR THIS TO HAPPEN - THAT IS, BEFORE WE MIGHT POSSIBLY DETECT CONTAMINATION IN OUR MONITORING WELLS ON THE OTHER SIDE OF EDWARDS RUN. WE WOULD NOT ANTICIPATE ANY VAST AMOUNT OF CONTAMINATION COMING OUT OF THE LANDFILL OR ANY OFFSITE MIGRATION IN THE GROUNDWATER AFTER IMPLEMENTATION OF THE PROPOSED REMEDY.

ISSUE: IS THE KRAMER LANDFILL STILL RANKED #3 IN THE NATION?

RESPONSE: THE RANKING DOES NOT CHANGE AFTER THE STUDY. WE DO NOT RERANK THE SITES AFTERWARDS. A RANKING OF 3 DOES NOT MEAN THAT THIS SITE IS THE THIRD WORST SITE IN THE COUNTRY. IT MEANS THAT ON THE FORMS AND ON THE CRITERIA THAT WE USED TO EVALUATE THE SITE, IT SCORED RELATIVE TO THE OTHERS AT THE TOP. THE CRITERIA USED ARE BASED ON POTENTIAL. THE ORIGINAL POTENTIAL AT THIS SITE WAS FOR CONTAMINATION OF MUNICIPAL WELLS OVER A MILE AWAY. THAT'S THE EXTENT TO WHICH WE EVALUATE THE POTENTIAL HAZARD OF EACH SITE IN ORDER TO GET THEM RANKED. WHERE IT'S LOCATED ON THE LIST DOESN'T MATTER FOR FUNDING. EPA'S PERSPECTIVE IS THAT IF IT'S ON THE LIST, IT IS ELIGIBLE FOR CERCLA FUNDING. PEOPLE HAVE USED THE RANKING AS AN ATTEMPT TO SHOW TOXICITY. IT IS NOT MEANT TO DO THAT. IT IS AN EVALUATION OF A POTENTIAL PROBLEM AND IS BASED ON THE AMOUNT OF HAZARDOUS WASTE SUSPECTED OF BEING THERE. THE FACT THAT IT'S ON THE LIST IS ALL THAT REALLY MATTERS.

ISSUE: WHAT YOU HAVE FOUND IS, BY SOME STUPID QUIRK OF LUCK, A LANDFILL LOCATED IN WHAT YOU ARE CALLING A SAFE AREA. YOUR STUDY INDICATES THAT IT IS NOT GOING TO GO ANYWHERE, THAT THE FUMES AREN'T GOING TO HURT ANYBODY, AND THAT IT IS NOT GOING TO DAMAGE THE WATER SUPPLY OR ENVIRONMENT.

RESPONSE: WE DIDN'T SAY IT WAS NOT CAPABLE OF MOVING. WE SAID THAT THE RATE AT WHICH IT WOULD MOVE WOULD BE EXTREMELY SLOW. THE EPA IS CONCERNED WITH BOTH PUBLIC HEALTH AND THE ENVIRONMENT. THE PUBLIC HEALTH POTENTIAL RISKS FROM THIS SITE ARE CONSIDERED LOW RELATIVE TO OTHER SITES. THE ENVIRONMENTAL DAMAGE CAUSED BY THE SITE IS SUBSTANTIAL. THIS PLAN WILL PROTECT BOTH THE PUBLIC HEALTH AND THE ENVIRONMENT. THERE IS A DANGER FOR SOMEBODY TO GO ON THAT SITE AND IT IS MAINLY A PHYSICAL HAZARD. AS FAR AS THE AIR EMISSIONS ARE CONCERNED, THEY CAN CHANGE. THE ONE'S WE DO HAVE INDICATE THAT THERE IS A POTENTIAL THREAT FROM A CONSTANT/LIFELONG EXPOSURE TO THOSE CHEMICALS. THAT TELLS US THAT WE SHOULD EVALUATE THE POTENTIAL RISK ASSOCIATED DOWN THE ROAD. FIRST, THOUGH, LET'S EVALUATE IT. THE RISK IS NOT ACUTE; IT IS LONG-TERM CHRONIC.

ISSUE: YOU SAY PUBLIC HEALTH. ARE YOU GOING TO INCLUDE THE PEOPLE IN A PUBLIC HEALTH STUDY? YOU SHOULD START STUDYING THE PEOPLE NOW TO SEE IF THERE ARE ANY CHANGES BETWEEN NOW AND THE FUTURE.

RESPONSE: WE FOUND NOTHING TO INDICATE ANY IMMEDIATE HAZARD THAT WOULD REQUIRE A STUDY. THERE IS NOTHING TO STUDY. ARE YOU ASKING WHY SHOULDN'T WE BE TAKING STUDIES OF THE PEOPLE TO SEE IF THERE IS AN EFFECT ON THEM? THE ANSWER IS BECAUSE WE ARE GOING TO BE REMEDIATING THE SITE AND ELIMINATING THE CURRENT CONTAMINANT PATHWAYS OF EXPOSURE.

ISSUE: YOU SAY YOU ARE GOING TO, BUT THAT LANDFILL CAN SIT THERE AND THAT'S A CHANCE WE TAKE. YOU DON'T KNOW HOW IT IS REALLY GOING TO AFFECT US.

RESPONSE: THE ONLY PATHWAYS OF EXPOSURE TO THE RESIDENTS ARE THROUGH THE LEACHATE THAT'S COMING OUT OF THE LANDFILL AND INTO EDWARD'S RUN, AND THROUGH THE AIR. ALL OF THE REMEDIAL PLANS THAT ARE BEING EVALUATED ARE GOING TO STOP THE MIGRATION OF ANY OF THESE CONTAMINANTS THROUGH THOSE PATHWAYS. THERE WILL NOT BE EXPOSURE IN THE FUTURE, WHEN WE IMPLEMENT ONE OF THESE PLANS.

TOPIC: ADMINISTRATIVE ISSUES

ISSUE: WITH REGARD TO THE PUBLIC COMMENT PERIOD, WILL YOUR DECISION BE MADE THEN (WHEN IT'S OVER) OR IN A YEAR OR SO?

RESPONSE: THE PROBLEM IS WITH OUR TREATABILITY STUDY. THE TYPE OF TREATMENT SYSTEM WE WILL USE IS NOT KNOWN AT THIS TIME. WE'RE GOING TO STUDY THE TYPE OF TREATMENT SYSTEM WE WILL USE. THAT WILL BE A SLOW DECISION, BUT WE REALLY DON'T NEED TO KNOW FOR A FEW MORE MONTHS. WE ANTICIPATE MAKING A DECISION ON THE SELECTED ALTERNATIVE IN EARLY SEPTEMBER. THE PUBLIC COMMENT PERIOD CLOSES AUGUST 12 AND WE WILL EVALUATE ALL OF THE COMMENTS FROM THE PUBLIC, THE STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION, THE COUNTY, AND OUR INTERNAL COMMENTS. IT REALLY DEPENDS ON WHAT THE COMMENTS ARE AS TO WHAT WE DECIDE FOR THE SITE.

ISSUE: ARE YOU TELLING ME THAT AFTER THIS ONE-HALF MILLION DOLLAR STUDY, YOU ARE GOING TO DEPEND ON COMMENTS FROM ME AND THE AUDIENCE HERE ON HOW YOU SHOULD DO THIS THING?

RESPONSE: WE WOULD USE YOUR COMMENTS IN GUIDING US IN OUR DECISION. WE WILL ALSO BE RECEIVING OUR CONSULTANT'S RECOMMENDATION. THE PURPOSE IN COMING TO THE PUBLIC IS NOT BECAUSE WE DON'T KNOW ANYTHING. IT IS IN CASE WE MISSED ANYTHING. YOUR CONCERNS ARE IMPORTANT TO US, AND THIS PROVIDES YOU WITH AN OPPORTUNITY TO PARTICIPATE IN THE SUPERFUND PROGRAM.

ISSUE: DO YOU HAVE AN ALTERNATIVE THAT YOU PREFER OVER THE OTHERS?

RESPONSE: WE ARE LEANING TOWARD CERTAIN ALTERNATIVES. TENTATIVELY, WE ARE LEANING TOWARD CAPPING THE SITE AND INSTALLING A PUMPING AND COLLECTION/TREATMENT SYSTEM. WE ARE STRONGLY CONSIDERING AN UPGRADIENT SLURRY WALL AS WELL.

I THINK SOMETHING THAT HAS NOT BEEN BROUGHT UP HERE IS THAT NONE OF THE RECOMMENDED ALTERNATIVES ARE GOING TO BE A QUICK-FIX SOLUTION. THIS PUMPING AND COLLECTION/TREATMENT SYSTEM THAT WE ARE PROPOSING MAY GO ON FOR AS MANY AS 30 YEARS.

ISSUE: CAN'T WE HAVE THE CONSULTANT'S RECOMMENDATION -- NOW? COULD HE TELL US, PLEASE, WHAT IT IS?

RESPONSE: HIS RECOMMENDATION IS LISTED IN THE BACK OF THE FACT SHEET. THE RECOMMENDATION INCLUDES THE CAP (OF THE LANDFILL), THE GROUNDWATER PUMPING AND COLLECTION SYSTEM, AND THE DEWATERING/EXCAVATION OF THE LAGOON.

BECAUSE WE DO NOT HAVE THE TREATABILITY STUDY COMPLETE YET, WE DO NOT KNOW AT THIS TIME, ON A COST BASIS, WHETHER THE CLAY IN A CAP WOULD BE MORE FEASIBLE TO KEEP THE WATER FROM FLOWING DOWN THROUGH THE FILL OR AN UPGRADIENT SLURRY WALL, WHICH WOULD KEEP WATER FROM FLOWING UNDER THE FILL. SINCE WE ARE STILL STUDYING ALL THE INFORMATION THAT WE ARE OBTAINING, WE DO NOT KNOW QUITE HOW TO COST THE ALTERNATIVE OR CHOOSE ONE AS A REMEDY. WE'RE REALLY NOT IN A POSITION YET TO SAY OR RECOMMEND THAT "YES," WE NEED CLAY IN THE CAP IN ORDER

TO KEEP THE LEACHATE GENERATION DOWN OR THAT WE NEED THE WALL. WE'RE CLOSE (TO SELECTING AN ALTERNATIVE), AND WE ARE WORKING ON IT. THE TREATABILITY STUDY IS ONGOING; WE'RE TAKING A LOOK AT SOME OTHER CONSIDERATIONS
AND WILL BE DETERMINING IN THE NEAR FUTURE THE REMEDY FOR THIS SITE.

ISSUE: WHEN WOULD ONE OF THE PLANS BE ACCOMPLISHED. HOW MANY YEARS BEFORE ITS DONE?

RESPONSE: THE NEXT STEP IS DESIGN, AND THAT DESIGN WILL ACTUALLY GIVE US THE CONSTRUCTION SCHEDULE. RIGHT NOW, WE'RE ASSUMING IT IS A 12-MONTH DESIGN PERIOD, SO WE'RE TALKING ROUGHLY A YEAR UNTIL CONSTRUCTION GETS GOING.

ISSUE: SO YOU HAVE NO COST EVALUATIONS?

RESPONSE: YES, WE HAVE ESTIMATED THE CAPITAL COSTS, BUT WE DON'T HAVE AN IMPLEMENTATION SCHEDULE BECAUSE WE HAVEN'T ACTUALLY COMPLETED A DESIGN OF THE ALTERNATIVE.

ISSUE: SO IT WILL TAKE YOU A YEAR TO DESIGN IT. OUT OF THE AIR, APPROXIMATELY HOW LONG WOULD IT TAKE TO INCORPORATE THIS DESIGN INTO THE GRANT?

RESPONSE: THIS IS A 66-ACRE LANDFILL. THERE IS GOING TO BE A LOT OF EARTH MOVING TO COVER THAT AREA WITH CLAY. I DON'T THINK THAT IT IS UNLIKELY THAT JUST PUTTING THE CLAY COVER ON IT WILL BE A 2-YEAR CONSTRUCTION PROJECT.

ISSUE: AND THAT'S THE END OF THE PROJECT WHEN YOU PUT THE CLAY COVER ON.

RESPONSE: NOT SO. THERE WILL BE AN ONGOING TREATMENT SYSTEM ALSO, FOR THE LEACHATE. AS WE PUT CAP ON, YOU WILL NOTICE THE LOWERING OF THE ODORS.

ISSUE: YOU SAID THAT IT WILL BE A YEAR BEFORE THE DESIGN IS COMPLETED, AND APPROXIMATELY TWO YEARS TO CAP IT WITH CLAY. WILL THE REMEDIATION OF THE SITE BEGIN RIGHT AFTER THE DESIGN IS COMPLETED.

RESPONSE: I THINK A 12-MONTH DESIGN PERIOD IS A LITTLE ON THE LONG SIDE. A 9 - 12 MONTH TIME FRAME IS REASONABLE. THAT WILL PROBABLY INCLUDE THE ADVERTISING PERIOD AND THE START OF THE CONSTRUCTION. I THINK A YEAR'S ESTIMATE UNTIL THE START OF CONSTRUCTION IS REASONABLE.

ISSUE: THIS STUDY, WHICH COST ONE-HALF MILLION DOLLARS AND IT IS ONLY ONE STUDY, IS PAID FOR OUT OF THE TAXPAYER'S MONEY, RIGHT?

RESPONSE: YES, IT IS.

ISSUE: CAN WE GET AN ACCOUNTING OF THIS HALF-MILLION DOLLARS? DID WE ACTUALLY SPEND A HALF-MILLION DOLLARS ON THIS STUDY.

RESPONSE: IT IS MORE THAN THAT AMOUNT.

ISSUE: DOES ANYBODY HAVE AN ACCOUNTING OF HOW THIS MONEY WAS SPENT?

RESPONSE: WE DO KEEP RECORDS AND EVENTUALLY, IN THE NEAR FUTURE, AN AUDIT WILL BE DONE. THE OUTCOME OF THAT AUDIT IS PUBLIC INFORMATION; EVERY PROJECT GETS AUDITED.

ISSUE: BUT DOES THE PUBLIC EVER SEE THESE?

RESPONSE: THEY DON'T, AS A MATTER OF COURSE, MAIL OUT THE AUDIT AS THEY DID WITH THE REPORT. YOU WOULD PRIMARILY HAVE TO REQUEST IT.

ISSUE: WILL ANY OF OUR ELECTED OFFICIALS SEE THIS?

RESPONSE: COULD YOU CLARIFY WHAT YOUR CONCERN IS?

ISSUE: YOU WERE HERE A YEAR AGO IN THIS SAME HALL. A YEAR LATER AND A HALF MILLION DOLLARS LATER YOU DON'T KNOW A DAMN THING MORE THAN WE KNEW A YEAR AGO.

RESPONSE: WE KNOW A GREAT DEAL MORE. WE'VE DONE A LOT OF TESTS. WE KNOW A LOT MORE ABOUT THE HYDROGEOLOGY, AND WE HAVE A RECOMMENDED PLAN OF WHERE WE ARE GOING.

ISSUE: I EXPECTED YOU TO TELL ME JUST EXACTLY HOW YOU WERE GOING TO CLEAN UP THIS PLACE.

RESPONSE: WE'RE HERE TO ASK YOU WHAT YOU WANT US TO DO.

ISSUE: I WOULD LIKE TO SEE THE LANDFILL COVERED. I'LL TELL YOU WHY. I HAVE A FARM THERE THAT IS WORTH ABSOLUTELY NOTHING WITH THIS LANDFILL THE WAY IT IS RIGHT NOW. I WANT TO SELL THIS FARM AND NOBODY WILL BEGIN TO LOOK AT IT WITH THE LANDFILL NEARBY.

RESPONSE: THE SITE WILL BE CAPPED.

ISSUE: YOU'RE SO SURE YOU'LL GET FUNDING FOR THIS? THE LAST I HEARD, IT WAS ALL TIED UP IN RED TAPE.

RESPONSE: THIS IS THE LAST YEAR OF THE 5 YEARS OF SUPERFUND. IT IS THE AUTHORITY OF CONGRESS TO TAX FOR AND APPROPRIATE MORE MONEY. THE CURRENT LAW EXPIRES IN OCTOBER. ACTUALLY THERE ARE SEVERAL BILLS IN CONGRESS BEING DEBATED RIGHT NOW.

TOPIC: LEGAL ISSUES

ISSUE: TELL ME THIS. IS THERE A STATE LAW WHICH GOVERNS CLOSING A LANDFILL? DOES THAT STATE LAW SAY THAT WITHIN A CERTAIN TIME THAT LANDFILL HAS TO BE COVERED?

RESPONSE: YES.

ISSUE: OKAY, AND HOW DO YOU GUYS GET AROUND THIS?

RESPONSE: WE'RE NOT RESPONSIBLE FOR THE LANDFILL. THERE ARE CLOSURE REQUIREMENTS UNDER THE STATE LAW. BUT IT'S NOT OUR SITE YET. THE KRAMER'S WOULD BE RESPONSIBLE PEOPLE UNDER THAT LAW TO CLOSE THE SITE.

ISSUE: AND HOW ARE THEY GETTING AWAY WITH THAT?

RESPONSE: THEY ARE ESSENTIALLY BROKE. THEY DO NOT HAVE THE CAPABILITY TO DO IT. HELEN KRAMER HERSELF HAS DECLARED BANKRUPTCY.

ISSUE: MRS. KRAMER TOLD ME THAT SHE HAS MONEY IN AN ESCROW ACCOUNT THAT SHE PAID TO SOMEBODY DURING THE LIFE OF THE LANDFILL. HOW MUCH MONEY IS THERE AND WHERE IS IT?

RESPONSE: MY NAME IS DAVE PALEY AND I'M WITH THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION. I'M ALLOWED TO GIVE AN ANSWER. I VISITED WITH THE KRAMERS AT THE END OF LAST SUMMER, AND JOE KRAMER WAS ASKING ME ABOUT HIS ESCROW ACCOUNT. HE REMEMBERED SOMETHING BETWEEN THE ORDER OF $30,000 OR $40,000 IN ESCROW. AND HE SAID, "WHATEVER HAPPENED TO MY MONEY"? I DIDN'T KNOW ANYTHING ABOUT IT AND I SAID IF HE COULD GIVE ME ANY CLUE AS TO WHO HE WAS DEALING WITH -- WHAT AGENCY, WHAT BRANCH OF THE GOVERNMENT, OR EVEN A NAME -- WHAT PERSON – THAT I WOULD DO WHATEVER I COULD TO TRACK IT DOWN. HE SAID HE WOULD GET IT FOR ME. I CALLED THE KRAMERS TWICE, AT INTERVALS OF A MONTH AFTER THAT AND SAID I'M WAITING TO HEAR ABOUT THE INFORMATION. AND I NEVER HEARD FROM HIM. AND I DON'T KNOW WHERE TO LOOK FOR IT. IF I DO GET SOME INFORMATION, SOME HELP FROM THEM, I WILL PURSUE IT TO THE EXTENT POSSIBLE.

OUR CAPPING ALTERNATIVE RUNS INTO THE MILLIONS OF DOLLARS, SO EVEN WITH THAT FUND OF THE KRAMER'S, YOU ARE ONLY TALKING ABOUT A VERY SMALL PERCENTAGE OF THE TOTAL COSTS.

ISSUE: SOMEBODY'S BREAKING THE STATE LAW THAT SAYS THIS LANDFILL HAS TO BE COVERED.

RESPONSE: I WOULD SAY THE OWNER BUT I CAN'T SPEAK AS A LEGAL COUNSEL. IT APPEARS THAT THEY ARE IN VIOLATION OF THE CLOSURE REGULATION UNDER THE STATE SOLID WASTE DISPOSAL LAW.

ISSUE: IS THERE ANYBODY HERE FROM THE STATE FROM THAT DEPARTMENT?

RESPONSE: DAVE PALEY IS WITH THE SUPERFUND PROGRAM DEPARTMENT, NOT WITH THE SOLID WASTE DEPARTMENT.

ISSUE: DAVE, HOW CAN THEY BREAK THIS LAW?

RESPONSE: THE KRAMERS, AS THE OWNERS OF THE LANDFILL, ARE RESPONSIBLE FOR A HOST OF PROBLEMS CAUSED BY THE LANDFILL. CLOSURE OF THE LANDFILL IS AMONG THE REQUIREMENTS UNDER THE LAW THAT THEY ARE IN VIOLATION OF. THE PENALTY IS FINES. THEY DON'T HAVE THE MONEY TO PAY THEM.

THE GOVERNMENT IS GOING TO SPEND A LOT OF MONEY TO CLEAN UP THE SITE. THERE WILL COME A POINT IN TIME, I'M SURE, WHENWE WILL RECOVER SOME OF THE COSTS. WE ARE STILL LOOKING FOR THE RESPONSIBLE PARTIES, BEYOND THE KRAMERS, TO THE GENERATORS WHO GENERATED THIS WASTE. THE U.S. JUSTICE DEPARTMENT IS GOING TO LOOK CAREFULLY TO FIND ANY HIDDEN POCKETS OF MONEY AND ALSO TO IDENTIFY WHO THE GENERATORS ARE SO AS TO RECOVER THE MONIES EXPENDED BY THE GOVERNMENT. THAT'S THE BEST WE CAN DO.

ISSUE: DURING THIS COURSE OF OPERATIONS OF THE LANDFILL, DIDN'T ANYBODY HAVE ANY IDEA THAT THESE VIOLATIONS WERE TAKING PLACE?

RESPONSE: YES. THERE WERE NUMEROUS NOTICES OF PROSECUTION, NOTICES OF REGISTRATION REVOCATION -- ALL OF THESE ENDED UP IN ADMINISTRATIVE COURT. EVERYONE IS INNOCENT UNTIL PROVEN GUILTY, SO THEY WERE ALLOWED TO CONTINUE TO OPERATE UNTIL THE COURT INJUNCTION, WHICH WASN'T ISSUED UNTIL 1981.

ISSUE: AREN'T THERE RECORDS AVAILABLE AS TO WHO THESE CUSTOMERS WERE AS GENERATORS?

RESPONSE: WE WERE NOT ABLE TO OBTAIN ANY RECORDS FROM THE KRAMERS. RECORDS THAT THE STATE HAS ARE ALMOST ENTIRELY WITH THE MUNICIPALITIES IN THE AREA.

ISSUE: WHEN YOU SAY THAT YOU COULD NOT GET ANY RECORDS FROM THE KRAMERS, DO THE RECORDS IN FACT EXIST, OR ARE THERE ANY INDICATIONS THAT THEY DESTROYED THEM?

RESPONSE: THERE IS NO INDICATION THAT THEY MADE A CONCERTED EFFORT TO DESTROY THEM.

ISSUE: ARE THEY STILL IN THE KRAMER'S POSSESSION THEN?

RESPONSE: THEY MAY OR MAY NOT BE.

ISSUE: HAS THERE BEEN ANY LEGAL ACTION TO GET THEM? HAVE YOU SOUGHT THEM?

RESPONSE: WE'RE ON THE REMEDIAL SIDE OF THE EPA. WE HAVE AN ENFORCEMENT SECTION THAT ADDRESSES THESE TYPES OF CONCERNS.

IN ADDITION TO THE ORAL COMMENTS RECEIVED AT THE PUBLIC MEETING ON AUGUST 1, 1985, THE EPA ALSO RECEIVED ONE WRITTEN COMMENT BASED UPON AN EDITORIAL THAT APPEARED IN A LOCAL NEWSPAPER.

ISSUE: THE EPA IS DELAYING THE INITIATION OF CLEANUP AT THE HELEN KRAMER LANDFILL UNTIL 1988 FOR POLITICALLY MOTIVATED REASONS.

RESPONSE: THE EPA IS NOT DELAYING THE INITIATION OF CLEANUP AT THE HELEN KRAMER LANDFILL UNTIL 1988. THE DESIGN OF THE SELECTED REMEDIAL ALTERNATIVE SHOULD BE INITIATED WITHIN THE NEXT FEW MONTHS IF FUNDING BECOMES AVAILABLE. THE DESIGN IS ESTIMATED TO TAKE APPROXIMATELY 12 MONTHS AND ACTUAL CONSTRUCTION OF THE

ALTERNATIVE COULD TAKE 24 MONTHS. WE CURRENTLY ESTIMATE THAT THE CONSTRUCTION WILL BE COMPLETED IN 1988 AND NOT INITIATED IN 1988, AS WAS REPORTED IN THE ARTICLE.

TIMES EDITORIAL

DUMP CLEANUP DELAY TAINTS EPA MOTIVES

THERE ARE AT LEAST 30 REASONS WHY THE U.S. ENVIRONMENTAL PROTECTION AGENCY SHOULD NOT WAIT UNTIL 1988 TO START CLEANING UP THE KRAMER LANDFILL IN MANTUA TOWNSHIP.

AN EPA CONSULTANT AT A LOCAL MEETING ON THE PROJECT LAST WEEK OUTLINED THEM HIMSELF.

"IN THE LEACHATE DISCHARGING INTO EDWARDS RUN, THERE ARE OVER 30 IDENTIFIED ORGANIC COMPOUNDS," SAID THE CONSULTANT, RICHARD E. WRIGHT, EXPLAINING THAT CONTAMINATED RUNOFF FROM THE FORMER TRASH DUMPSITE IS SPILLING INTO A NEARBY CREEK. "THOSE COMPOUNDS ARE BELIEVED TO BE CARCINOGENIC OR CAUSE BIRTH DEFECTS," HE SAID.

THE 30 CHEMICALS, AND THE 66-ACRE SITE'S SUSCEPTIBILITY TO UNDERGROUND FIRES, ARE THE REASONS WHY THE EPA HAS RANKED THE SITE AS FOURTH MOST DANGEROUS AMONG THE 400-PLUS TOXIC WASTE SITES NATIONALLY THAT QUALIFY FOR CLEANUPS WITH THE FEDERAL SUPERFUND. THE NUMBER ONE SITE -- LIPARI LANDFILL -- IS ALSO IN MANTUA TOWNSHIP.

EPA OFFICIALS SAY THERE HAS BEEN NO EFFECT ON LOCAL DRINKING WATER FROM THE KRAMER SITE. YET SUCH STATEMENTS OFFER LITTLE COMFORT TO PEOPLE WHO LIVE AROUND THE LANDFILL, WHO HAVE SHALLOW WELLS, AND WHO KNOW THAT CANCER-CAUSING CHEMICALS IN SURFACE WATER ARE ALSO A HEALTH CONCERN.

THE EPA HAS PROPOSED A $30 TO $40 MILLION PROGRAM THAT WOULD AT FIRST PREVENT THE CONTAMINATED LIQUID FROM SPREADING BEYOND THE LANDFILL'S BORDERS. THAT IS THE SAME THING THE AGENCY HAS DONE AT LIPARI IN A BENEFICIAL, BUT INCOMPLETE, PROJECT THAT HAS NOT YET REMOVED OR TREATED ANY OF THE TOXIC WASTE.

EARLY LAST YEAR, EPA OFFICIALS PREDICTED THAT IT WOULD BE 1985 BEFORE ANY CLEANUP WORK WOULD TAKE PLACE AT THE KRAMER SITE. THAT WAS REASONABLE AT THE TIME, SINCE STUDIES WERE JUST BEING STARTED AND THE FULL EXTENT OF CHEMICAL CONTAMINATION IN THE LANDFILL HAD BECOME KNOWN ONLY THE PREVIOUS YEAR.

THE DEMANDS ON THE SUPERFUND, WHICH ITSELF FACES A BATTLE FOR RENEWAL IN CONGRESS AT AN ADEQUATE FUNDING LEVEL, ARE NUMEROUS. AND THE STATE'S INCREASED SOURCES OF REVENUE TO ADDRESS HAZARDOUS WASTE PROBLEMS ALSO ARE NOT SUFFICIENT TO CLEAN UP EVERYTHING, IMMEDIATELY.

BUT BY DECIDING NOW TO DELAY CLEANUP WORK AT KRAMER UNTIL 1988, THE EPA IS SHOWING CONTEMPT FOR RESIDENTS OF MANTUA, WHO HAVE HAD TO LIVE WITH TWO OF THE WORST TOXIC TIME BOMBS IN THE COUNTRY IN THREE DECADES.

PERHAPS THE DECISION IS A POLITICAL ONE BASED ON THE NOTION THAT NEW JERSEY AND GLOUCESTER COUNTY -- WITH LIPARI, KRAMER, AND THE BRIDGEPORT RENTAL AND OIL SERVICES LAGOON IN LOGAN TOWNSHIP -- RECEIVING TOO LARGE A SHARE OF THE SUPERFUND TOO SOON. IF SO, IT ISN'T FAIR. KRAMER IS RANKED FOURTH ON THE SUPERFUND LIST BECAUSE OF WHAT IT IS, NOT WHERE IT IS.

THE EPA SHOULD RECONSIDER THE PROPOSED CLEANUP SCHEDULE. AND STATE, COUNTY AND LOCAL OFFICIALS SHOULD PUSH TO HAVE IT ACCELERATED.

TABLE 13-3
REMEDIAL ALTERNATIVES
COST SUMMARY AND COMPARISON

ALTERNATIVE	CAPITAL COST ($1,000)	O&M COST YEAR	O&M COST ($1,000)	O&M COST CAPITALIZED (A) ($1,000)	PRESENT WORTH (A) ($1,000)
1) NO ACTION	235	1-30	109.9	1,036.0	1,271.0
2) NEW RCRA LANDFILL	132,484	1	1,229.7	1,117.9	137,309.2
		2	965.4	797.8	
		3	680.0	510.9	
		4	664.6	453.9	
		5	649.2	403.1	
		6	633.8	357.8	
		7-30	233.4	1,183.8	
3) ACHIEVE FEDERAL STANDARDS					
A) WITH COMPLETE TREATMENT	30,114	1	789.4	717.6	35,975.4
		2-30	603.9	5,143.8	
B) WITH PRETREATMENT	28,503	1	1,045.2	950.2	35,874.7
		2-30	753.9	6,421.5	
4) EXCEED FEDERAL STANDARDS					
A) WITH COMPLETE TREATMENT	38,089	1	792.1	720.1	41,647.0
		2	521.6	431.1	
		3	412.3	309.8	
		4-5	344.6	449.3	
		6-9	296.6	583.8	
		10	311.6	120.1	
		11-19	286.6	636.4	
		20	301.6	44.8	
		21-29	286.6	245.3	
		30	301.6	17.3	
B) WITH PRETREATMENT	36,478	1	1,047.9	952.6	40,398.4
		2	621.6	513.7	
		3	447.3	336.1	
		4-5	361.6	471.5	
		6-9	296.0	582.6	
		10	311.6	120.1	
		11-19	286.6	636.4	
		20	301.6	44.8	
		21-29	286.6	245.3	
		30	301.6	17.3	

5) ACHIEVE SOME BUT NOT ALL FEDERAL STANDARDS					
A) CAP AND SLURRY WALL	34,566	1-30	188.9	1,780.8	36,346.8
B) "NO CLAY" CAP, SLURRY WALL, TREATMENT					
I) WITH COMPLETE TREATMENT	31,220	1	785.4	714.0	35,323.7
		2	559.9	462.7	
		3	459.9	345.5	
		4-5	405.6	528.9	
		6-10	369.9	870.7	
		11-30	361.9	1,187.9	
II) WITH PRETREATMENT	29,607	1	1,040.9	946.3	34,316.9
		2	709.9	586.7	
		3	529.9	398.1	
		4-5	440.6	574.5	
		6-10	396.9	934.3	
		11-30	386.9	1,270.0	
C) CAP	27,153	1-30	188.9	1,780.8	28,933.8
D) "NO CLAY" CAP, TREATMENT					
I) WITH COMPLETE TREATMENT	23,902	1	785.4	714.0	30,194.2
		2-30	654.9	5,578.2	
II) WITH PRETREATMENT	22,290	1	1,041.2	946.6	30,475.8
		2-30	849.9	7,239.2	
E) EXTEND PUBLIC WATER SUPPLY	589	1-30	109.9	1,036.0	1,625.0
OPTIONS:					
1) DOWNGRADIENT SLURRY WALL	757	1-30	0	0	757.0
2) IRRIGATION OF TREATED EFFLUENT	381	1-30	69.2	652.3	1,033.3

(A) DISCOUNT RATE OF 10% OVER 30-YEAR PROJECT LIFE.